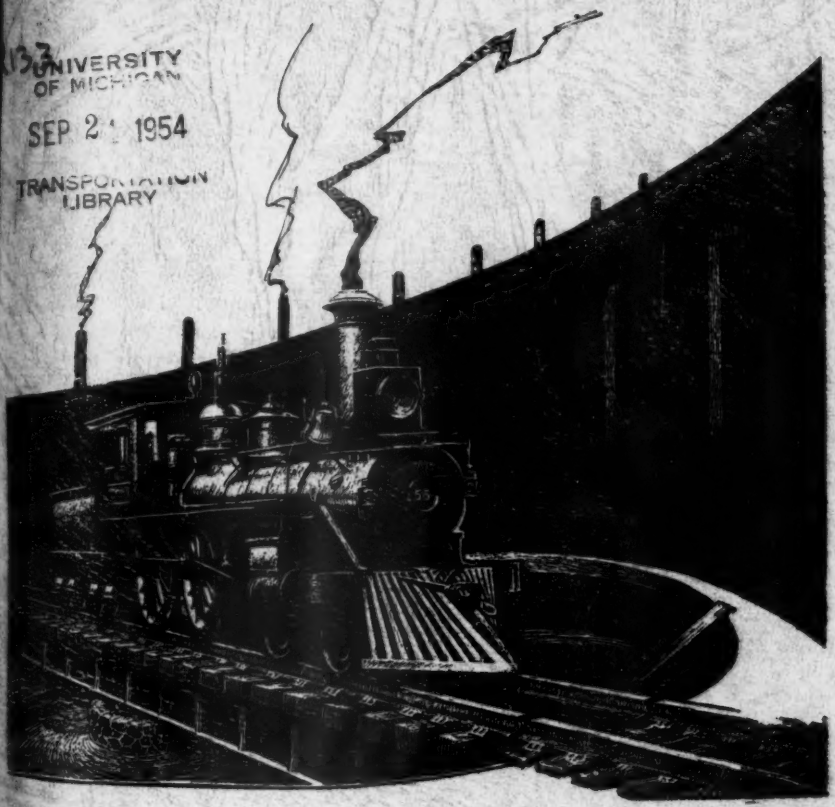
The Railway and Locomotive Historical Society

BULLETIN No. 90



THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY

MAY, 1954

BULLETIN No. 90

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The

Railway and Locomotive Historical Society,

Inc.

In presenting our first bulletin for 1954 we are continuing the interesting and valuable drawings on the different valve gears by Fred Jukes and the second installment on the steam locomotives of the Pennsylvania R. R. is included herewith. Both series will be completed at the close of the year.

In the past we have featured the many locomotives on the larger New England railroads but those of the Rutland were rather lightly touched in the special bulletin on the Vermont Central-Central Vermont Ry. for the simple reason that the publication was devoted to the Vermont Central rather than to the Rutland. Using that publication as a basis, Stewart Graham has constructed a revised and complete roster of the locomotives of this road and we hope that it will be of interest to our members.

We are glad to have with us again J. Harold Kiracofe and his article on "The Bucklen Line"—a short railroad that was soon absorbed by the Lake Shore and Michigan Southern and Gordon W. Lindsay's account of the Memphis & Charleston R. R. Another Newton paper is presented herewith on the First Depot in Aurora, Illinois and Mr. Ewan, Curator of the Camden County Historical Society forwarded an interesting account of the Marl Trains on the Camden & Amboy. Our relations with our Mother Country and the efforts of the railway pioneers in both countries are always of interest and the letter written by Evan Thomas of the Baltimore & Ohio R. R., to Edward Pease of the Stockton & Darlington Ry. in England, submitted by

Prof. G. A. Petch of the University of Durham, England, is of more than passing interest. And lastly, we are again indebted to Fred Jukes for his drawing and his illustrations used in connection with the McConnell locomotives. We hope that all will enjoy the make-up of this publication.

With our membership past the one thousand mark and with many of them new to this group, your Editor is going to give a little space to advise you about this publication. The founders of this Society wisely decided that the success of this publication should rest squarely on the shoulders of its members. Along the beginning, a paper had to be submitted before you could become a member but, as matters stand now, all contributions originate with or from our membership without any monetary reward and, as your Editor looks back over the list of names of those who have done this research and put this material in shape for publication, he is humbly grateful and proud of their efforts.

The Publication Committee is organized on a regional basis and, with our membership spread throughout this country, Canada and overseas, it is our intention not to slight any particular section, not for any great period of time at least. Even though the make-up of a single publication may preclude a certain section, our membership must remember that that section cannot be included without some material being on hand. Neither can the local committee do all the work without your assistance. In this "dollar chasing day" we fully realize that many other matters come before railroad research and to that end we have always been patient and not expected too much from either our committee or our members.

From time to time we have received, and it is pretty safe to assume that more will be forthcoming, complaints from some of our members that railroads in certain localities in which the writer is particularly interested, are not featured. This we can readily admit, but the fault, instead of resting with the committee rests with the writer. One of the best qualifications for an author, that this Editor knows of, is to be intensely interested in the subject of his paper. He, rather than someone else, should be the one to handle the subject.

The recent report of our Membership Committee shows that nearly 20% of our membership now live in one Pacific Coast state, a state that is rich in railroad history. Already, one of our members in that state has submitted a paper dealing on the local lines in the Los Angeles area and we hope and we want to feel that the many others in that state will follow suit.

In the thirty odd years that your Editor has worked with your publication, very few assignments have been made to our membership. Papers have been returned from well known, highly paid authors, who offered their contribution gratis in order to have it appear in our magazine but they had to be returned because they were not members. Thus, in making this explanation, we hope that any of our members who have the desire and the wish to submit a paper covering their efforts in this field, that they are cordially invited to do so. To those that fail to find something of interest to them on these pages, suggestions are always in

order and perhaps the deficiency can be remedied, with or without your assistance. We will certainly make every effort in the matter.

With this publication we have produced ninety-nine numbered and not numbered bulletins and they have covered a vast range of subjects on our American railroads as well as those of Canada and overseas. All of these contributions represented the efforts of our membership, something of which we are intensely proud and we are always interested in helping the "newcomer" to our columns.

Cover Design

The little 4-4-0 locomotive on the turntable used on the cover of this publication is the work of our member—Manville B. Wakefield. Pennsylvania R. R. No. 55, Class A (D-1), built by the Altoona Machine Shops of that railroad in 1872 is the subject of his sketch and it was prepared in order that it might help serve as an illustration for the locomotives of that road featured in this bulletin. The location could be anywhere and, we can assure our readers that in order to simplify the work of the artist, the roundhouse was depicted as being empty, something that was seldom seen on the "Pennsy." We deeply appreciate the kindness of the artist in preparing this sketch for our use.

101 Valve Motions.

By Fred Jukes.

(Third Installment)

Four groups of valve gears were described and illustrated in Bulletins Nos. 88 and 89. Those considered in this section are of the Walschaerts Principle and the Stevart Gears. As in prior installments, each drawing is numbered, and the description of each gear in the text carries the name and corresponding drawing number. The gears included in this article are as follows:—

Guinotte
Berthe.
Angelé.
Walschaerts I. (1844 Patent)
Walschaerts II.
Walschaerts III.
Stephenson-Molyneux.
Heusinger.
Stevens I.
Stevens II.
Walschaerts, Italian State Rys.
Kingan-Ripken.
Riekie.
Mason-Walschaerts.
Walschaerts Variable Lead.
Kitson.
J. T. Marshall.
Beames.
Walschaerts, Baldwin 3-cylinder.
Gresley.
Walschaerts, 3-cylinder. Eastern Railway of France.
Vincent.
Churchward-Stevart.
Young.
Deeley.
Belpaire.
Belpaire-Stevart.

WALSCHAERTS VALVE GEAR

While the Hackworth gears generally derive their movement from one eccentric, and the so-called link motions, such as Stephenson, Gooch and Allen, from two, the Walschaerts gear, in being driven from one rotating and one reciprocating point, constituted a new and radical departure from the existing types.

It was patented by Egide Walschaerts in 1844. Walschaerts, (born the same year as the younger Hackworth) was twenty-four years old at the time and, except for the Stephenson link, his invention was so far ahead of all other means of distributing steam to the cylinders, that it was but a short time before its use became widespread over Continental Europe.

A gear almost identical to Walschaerts' later and improved motion was patented, in 1849, in Germany, by Heusinger von Waldegg, and has been called the Heusinger, or Waldegg, gear by many of the earlier writers on the subject; however, there is now no question but that Walschaerts was the prior inventor.

Walschaerts' motion got nowhere in Britain, and little further in America. William Mason, in the '70s and '80s, applied it to most of his "Mason-Fairlie" double-truck engines, in which the driving truck was beneath the boiler. These locomotives, according to reports, were phenomenal in their performance and, though Mason tried his best to for-

ward the use of the Walschaerts gear in America, the conservatism in the Railway Master Mechanics Association of that day put a stop to its adoption in this country. Why Mason never applied the motion to his fine eight-wheel locomotives has been a source of wonder to many, but it is probable that his artistic sense revolted at the thought of the beautiful lines of his engines being marred by an outside motion. Mason's locomotives were widely acknowledged to have been among the most efficient and beautifully proportioned of their era.

The only other case of more or less extensive application of the gear to American locomotives before the turn of the century was by A. J. Stevens, of the Central Pacific, who used it in connection with his double-valved engines, both valves being driven through independent valve stems from a wrist-plate at the top of the lap/M lead lever. The Cooke Locomotive & Machine Co. also used the Walschaerts gear on their Rotary Snow Plow engines, an eccentric and strap outside the main pin taking the place of the usual return crank.

From 1904 on, when the American Loco. Co. applied Walschaerts motion to the first Baltimore & Ohio Mallet Compound, the gear rapidly forged its way to the front on American Railroads. Locomotives had been growing to such proportions that the eccentrics and other moving parts of the Stephenson gear became so heavy, and the velocity of the rubbing surfaces so high, that something radical had to be done. Then, too, the removal of these heavy parts from between the frames was imperative so that room could be had for proper bracing.

Walschaerts motion meant a big reduction in weight and it was the means of providing a straight-line motion which was both accessible and trouble free. Today it is in almost universal use for modern steam power on the railroads of both America and Britain, in fact, the world over.

Advocates of the Stephenson link have always contended that a variable lead was to be preferred. Be this as it may, the newer gear has proven its fitness to survive. The fact that it can be fitted with the variable lead features must not be forgotten. This, however, introduces more moving parts into a mechanism in which the virtue of simplicity is almost a must.

A large number of valve gears have been based on the Walschaerts principle, just as Hackworth's gear provided the starting point for dozens of others. Once the basic features of the three leading types of valve motion are understood the many varieties built around them are easily classified.

Walschaerts was appointed foreman of the Midi shops at Brussels, in 1844, and held this position till 1855. It is probable that the lack of a university diploma militated against his further promotion. He lived sixteen years after his retirement in 1855, and died at St. Gilles, near Brussels, on February 18, 1901.

Edmund Heusinger von Waldegg in 1875 recognized Walschaerts' right of priority in the invention of his valve-gear, though this had been questioned in Germany for many years. Another motion was patented by Florian Angelé in France, in 1842. It was similar to the later

gears of Walschaerts and von Waldegg in that its expansion link was driven by a return crank, and reverse and cut-off were obtained as in Walschaerts'. However, no position was made for lap and lead movement except by changing the position of the back end of the eccentric rod on the return crank. This motion was described in ENGINEER (London) of 1906, and in the REVUE de MECHANIQUE (Paris) of 1902.

GUINOTTE.

(Dwg. 52)

Years before the introduction of the link-motion, the engineering profession was well aware of the advantages of working steam expansively; and, in early American practice, we find many gears of the hook-motion type arranged for adjustable cut-off by means of a separate valve working above the main valve. The travel of this valve was altered by a number of methods, most of which entailed the use of an additional lever in the cab.

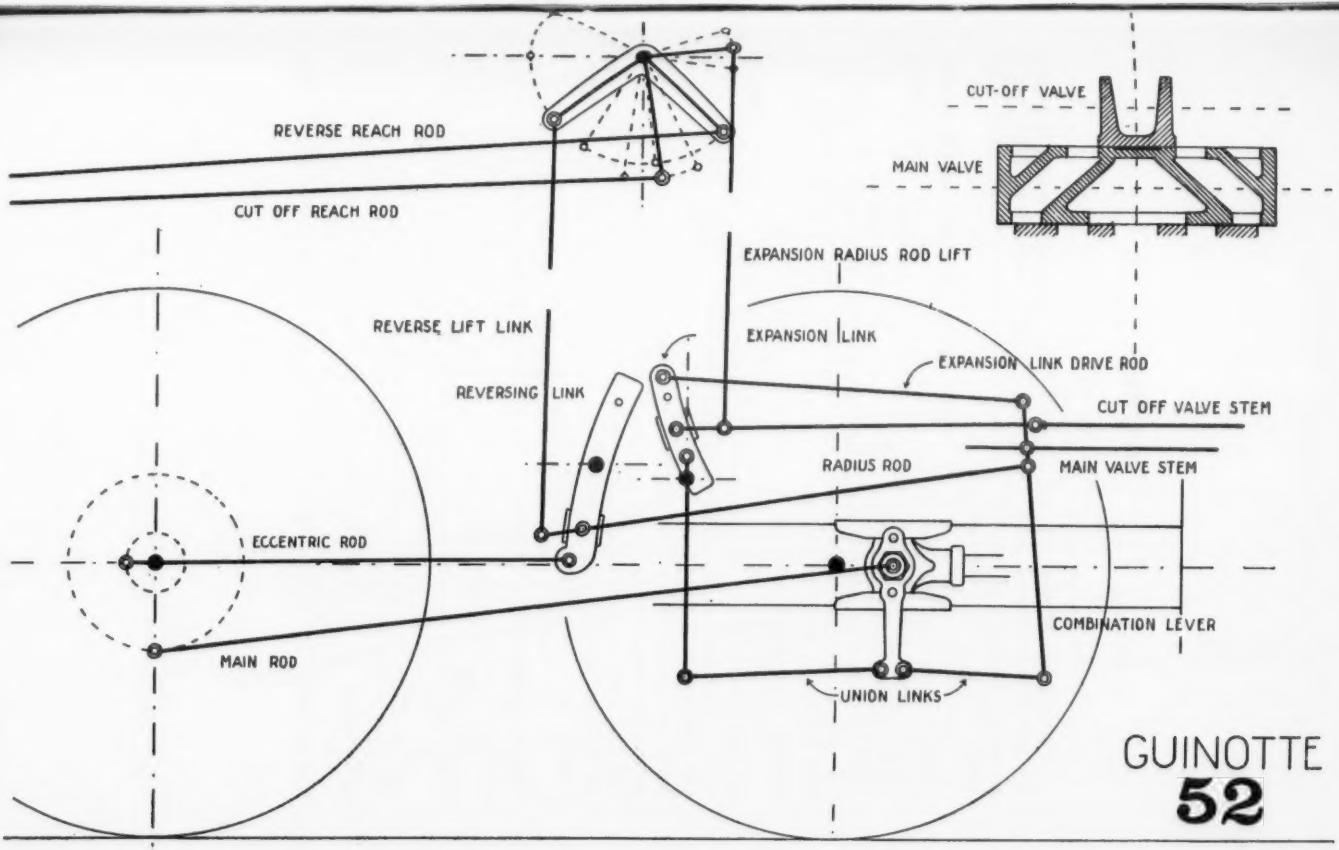
Even after Walschaerts' and Stephenson's gears came into being, the use of supplementary valves persisted; but due to the complicated nature of such gears few survived.

The Guinotte motion was an attempt to improve the efficiency of the Walschaerts gear. The drawing shows a normal motion, with a super-imposed gear consisting of an extra link, radius rod, union link, combination lever and valve stem to move the riding cut-off valve. The engine so fitted was one of a class of passenger locomotives (2-4-0) of the Grand Central Ry. (Belgium), and was shown at the Vienna Exhibition of 1873.

Due to the rear drivers being the main ones, the tumbling—or reverse—, shaft was placed above the Belpaire firebox. The reversing reach rod was controlled by the usual lever, but with only three notches in the quadrant; forward, center, and back. The expansion reach rod was worked by screw and handle to permit of fine adjustment.

It will be seen that, while compression and exhaust are constant, admission and cut-off are under the control of the engineer. The expansion link is a floating member, with its moving fulcrum at the upper end of the near combination lever. It is actuated from the upper end of the forward combination. This compound motion gives the upper, or expansion, valve a very rapid movement within a range of from 10% to 78%. Exhaust openings of the main, or lower, valve remain unaffected. The two valves are shown above.

The Guinotte gear gave remarkable indicator diagrams, showing at 12% cut-off a card superior to that of a conventional Walschaerts gear at 25% cut-off but, like many another gear of complicated design, it never got beyond the experimental stage. In addition to the multiplicity of its parts, its chief defect was in the loading of the return crank with altogether too much machinery. Complicated locomotive valve gears are not only high in first cost, but entail heavy maintainance expense.


REVERSE REACH ROD
CUT OFF REACH ROD
CUT-OFF VALVE
MAIN VALVE
EXPANSION RADIUS ROD LIFT
REVERSE LIFT LINK
EXPANSION LINK
EXPANSION LINK DRIVE ROD
REVERSING LINK
CUT OFF VALVE STEM
RADIUS ROD
MAIN VALVE STEM
ECCENTRIC ROD
COMBINATION LEVER
MAIN ROD
UNION LINKS

GUINOTTE
52

BERTHE.

(Dwg. 53)

Monsieur Berthe, of the French State Railways was responsible for this design. It was exhibited at the Paris Exposition of 1900, and is a shining example of how far one can go in tracking down that illusive ideal, the perfect valve-motion.

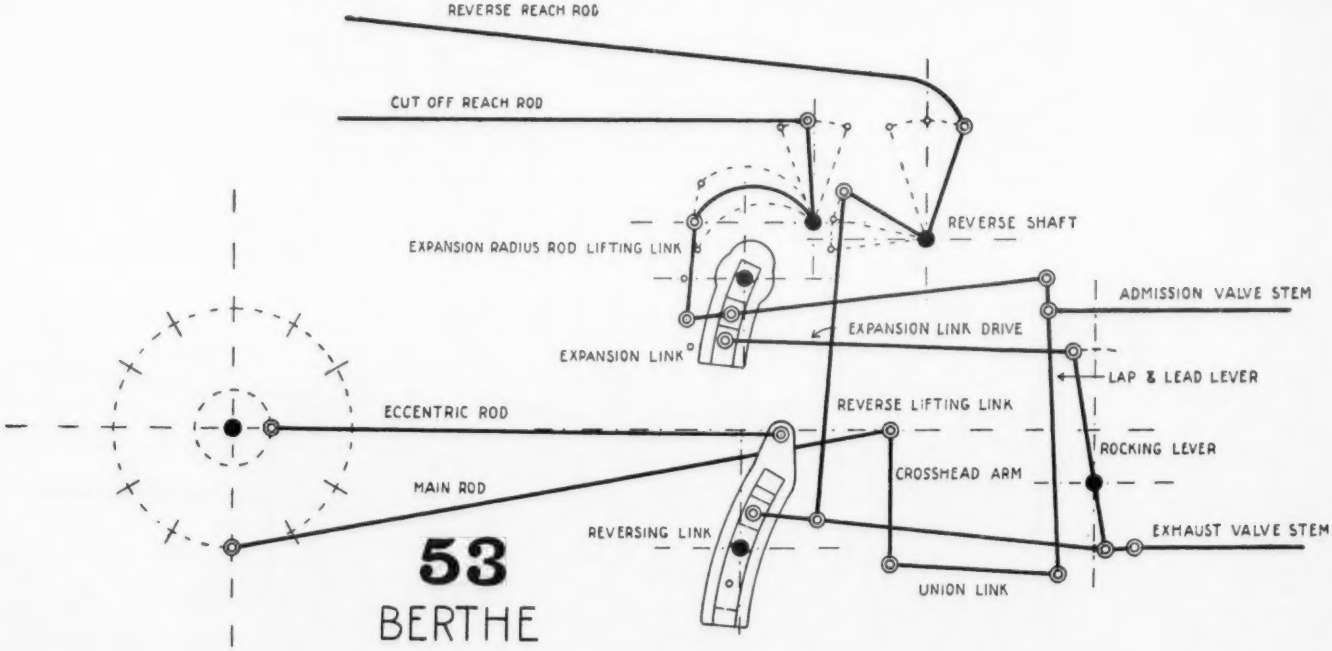
The Berthe gear is one of several using separate admission and exhaust valves, in this case of the piston type. The whole contraption is driven from one return crank through an eccentric rod, to the lower, or reversing link. The radius rod from this link connects to a rocking lever, and also to the exhaust valve stem through a short lever. By means of the usual reach rod, tumbling shaft and hanger, the link block can be placed in two positions, full forward or full backward motion. This gives constant travel to the exhaust valve.

The expansion link is driven by a rod extending to it from the top of the rocking lever, and pinned to its lower end. This gives the link a fixed amount of swing. Cut-off is attained by raising the back end of the expansion link radius rod towards its fulcrum. When the cut-off lever and reach rod are in full forward position, the link block will be at the fulcrum, and the only motion of the valve will be that due to the lap and lead lever. By pulling the cut-off lever back, the link block may be dropped to give any degree of cut-off from zero to full stroke. Illustration shows it set for about 60%.

In the design shown, both reversing and cut-off links are fulcrumed in brackets supported by the heavy guide yoke, while the rocking lever is fulcrumed on a bracket extending from the back cylinder head.

The engine so equipped had screw reverse and cut-off gears which must have made reversing and adjustment of cut-off a very slow process.

While the Berthe gear did away with thermal losses due to the cooling effect of exhaust steam on admission ports and passages, and got rid of the exhaust without undue compression, it carried such an aggregation of moving parts that it could never have stood up under severe or continuous work. It would seem, too, that with all the mechanism involved, the return crank would be carrying a pretty heavy load.


REVERSE REACH ROD
CUT OFF REACH ROD
REVERSE SHAFT
EXPANSION RADIUS ROD LIFTING LINK
ADMISSION VALVE STEM
EXPANSION LINK DRIVE
EXPANSION LINK
LAP & LEAD LEVER
ECCENTRIC ROD
REVERSE LIFTING LINK
ROCKING LEVER
CROSSHEAD ARM
MAIN ROD
REVERSING LINK
EXHAUST VALVE STEM
UNION LINK
53
BERTHE

ANGELE.

(Dwg. 70)

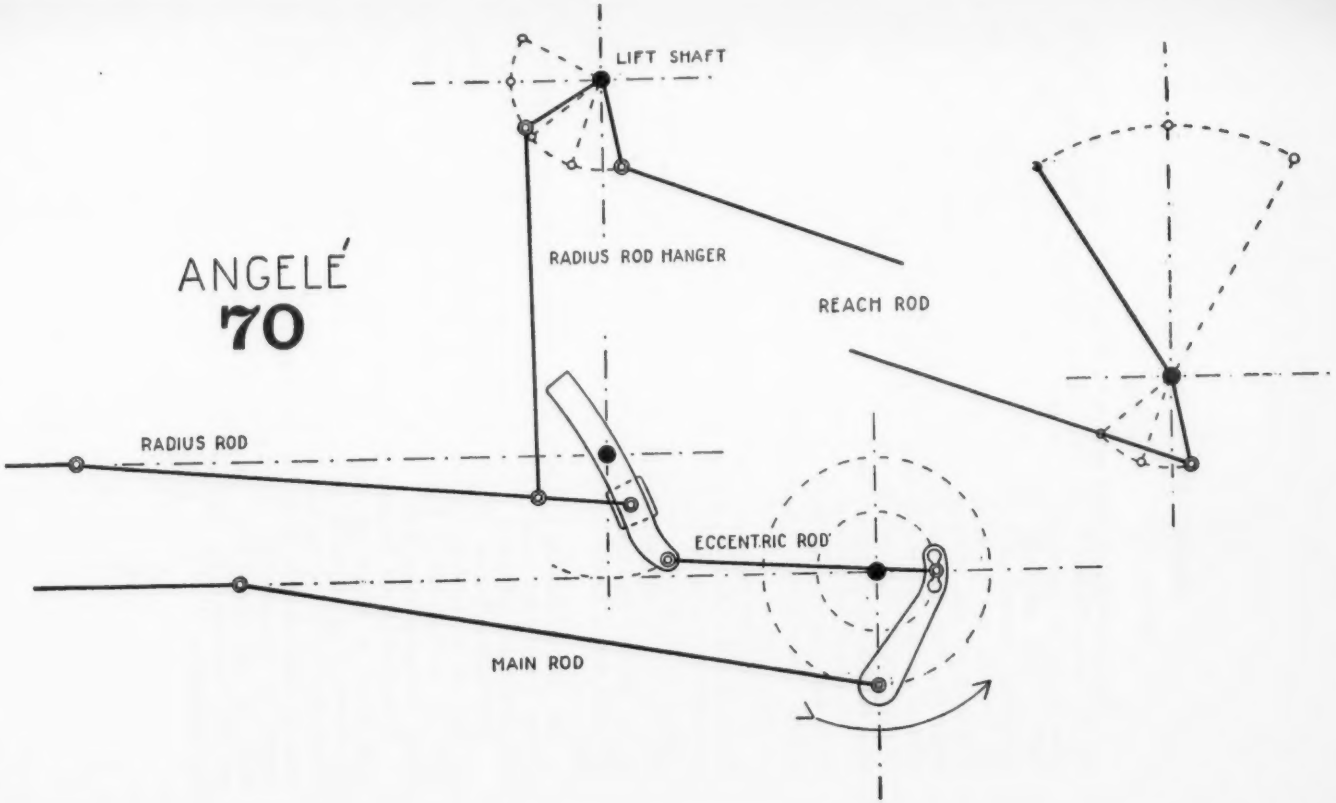
In 1902, an engineering journal, *The Revue de Mechanique*, of Paris, carried an item mentioning the invention of a valve gear by one Florian Angelé, in 1842. Ten years later, Dec. 27, 1912, the prominent English magazine, *The Engineer*, described and illustrated this motion, many years after the Frenchman's application for his patent on Nov. 29, 1842. Had Angelé provided workable means for supplying lap and lead motion to his gear, it would in all probability resulted in the general form later arrived at by Walschaerts and Heusinger von Waldegg.

The drawing shows its main features—the return crank, eccentric rod, link, radius rod and hanger, all of which are identical with the modern form of Walschaerts gear. It is, moreover, the first recorded use of the curved link (if we except James' whose invention has been lost to us, and about which little, if any, definite information exists) which Angelé in his application rightly contended was far superior to the many forms of V- and drop-hook motion of the day in the matter of reversing.

Some of its features are of interest: the two holes drilled in the eccentric rod end of the return crank appear in the illustration, and apparently provide in an awkward way for the securing of angular advance necessary to lead. This feature would, of course, condemn it as a workable proposition, as the connection would have to be changed each time the engine was reversed.

Another odd feature is the reach-rod connection between the reverse lever and lift shaft. While not usual, this arrangement has occasionally been made use of. In this case the lift shaft is hung above the boiler. Many of the earlier locomotives had small boilers and the prevailing practise was to keep the center of gravity as low as possible; and this position served admirably for an outside gear.

Though Angelé's motion provided for a variable cut-off it was, for obvious reasons, never a factor in the development of the locomotive, lacking, as it did, a very necessary detail. The really strange thing about it is that it never received more than a brief mention until nearly seventy years after its invention. It is included here merely as a fragment of locomotive history.


ANGELE'
70
LIFT SHAFT
RADIUS ROD HANGER
REACH ROD
RADIUS ROD
ECCENTRIC ROD
MAIN ROD

WALSCHAERTS, I. (Patent of 1844).

(Dwg. 71)

This, the original valve motion of Walschaerts, which was patented by his friend Fisher, bears little resemblance to the later form which was applied to locomotive 98 of the Belgian State Railway, Sept 2nd, 1848. Inside cylinders, with steam chests above, indicated the use of eccentrics instead of return cranks; the main difference though was in the link and its drive. The eccentric blade broadened out into a T-shaped end, the cross member having pins at its upper and lower extremities. The link has a radius of the eccentric rod length, but its central portion opens out in an elliptical form. It appears very much like a form of hook-motion with the two hooks joined, and the whole oscillating about a fixed point.

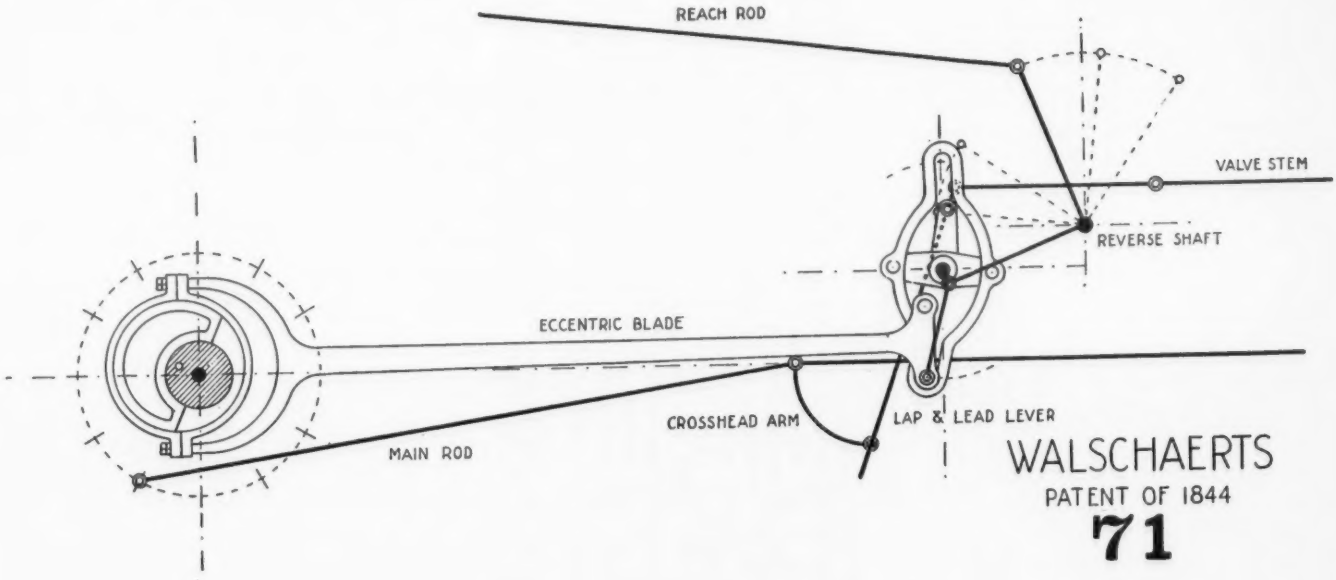
In operation, as either of the two eccentric rod pins is brought to its respective end of the link it gives forward or back motion to the engine. The open space in the center of the link allows clearance for the pin not in use.

It is obvious that, as the reverse lever is moved from its full backward position (as shown in drawing) toward center, the lower pin works at a shorter radius from the link center, thus giving the link and its rocker arm greater travel. So we have the odd effect of lengthening the valve travel, and slightly altering the lead, as the reverse lever is hooked up. By hooking up close to the center, both pins are brought within the elliptical space, where they have room to move without touching the link.

So that, in starting his train with this motion, we see the engineer moving his reverse lever slightly forward to admit steam for almost full stroke, and dropping it toward the center to shorten the cut-off.

The salient feature of the 1844 Walschaerts gear was the provision for lead which, in this case, was by a lap and lead lever, whose lower end slid in a swivelling block at the outer end of the crosshead arm. Today we use a union link.

It is doubtful if the gear, as shown in the patent application, was ever placed in actual use, for it has one serious disadvantage. When the reverse lever is placed on center the link is free of any connection, except that with the lap and lead lever through the link arm. In this case, the usual amount of lead would vanish, as the valve rod pin would become the fulcrum, and the lap and lead lever would move the link while the valve stood still. The bulging link and double-pinned eccentric rods disappeared before we have any record of its application to the locomotive.



WALSCHAERTS

PATENT OF 1844

71

WALSCHAERTS, II.

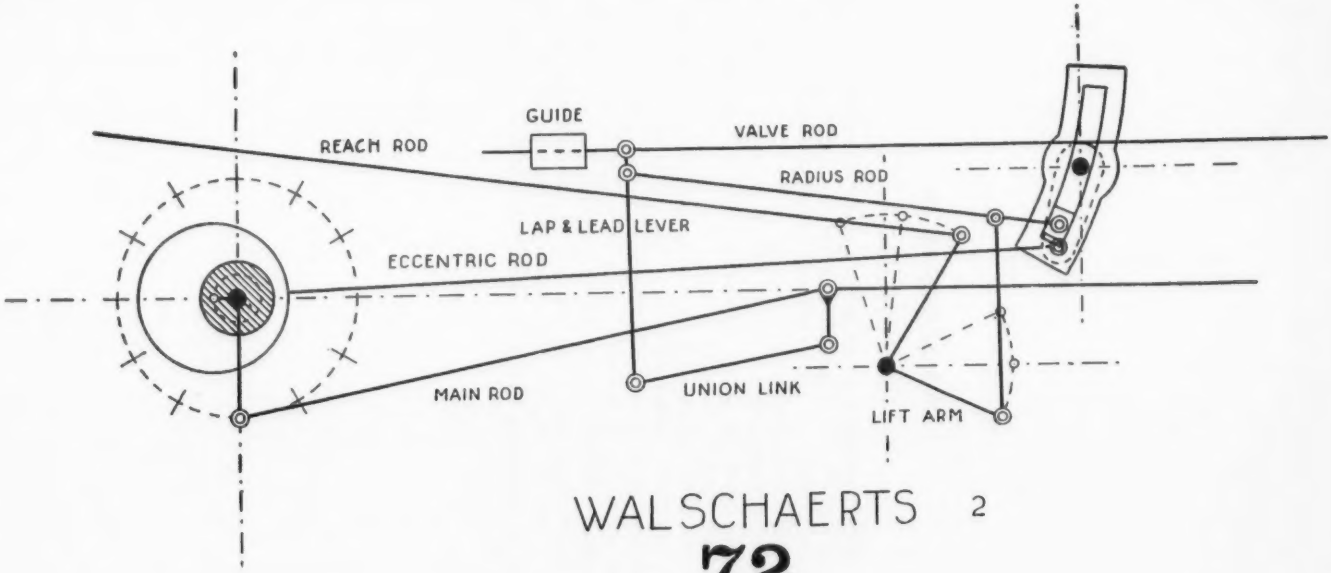
(Dwg. 72)

This valve motion, the first really practical form of Walschaerts' gear, was the outcome of his original invention and is little different from that in use today. It was designed for outside admission (slide valve) and apparently for inside cylinders, as an eccentric is used, instead of the return crank necessary with outside crank-pins.

The point in which it differs mostly from modern gears is the position of the link, which is carried forward to a point just back of the cylinder. The radius rod extending back from the link makes it necessary to place the concave side of the link in that direction.

This forward position of the link calls for an extreme length of both eccentric rod and valve rod, and the carrying of the union link back, instead of forward, from the cross-head arm to the lap and lead lever.

This was the arrangement used by A. J. Stevens in the design of his double-valve motion for the famous 4-10-0 locomotive "El Gobernador."



WALSCHAERTS 2

72

WALSCHAERTS, III.

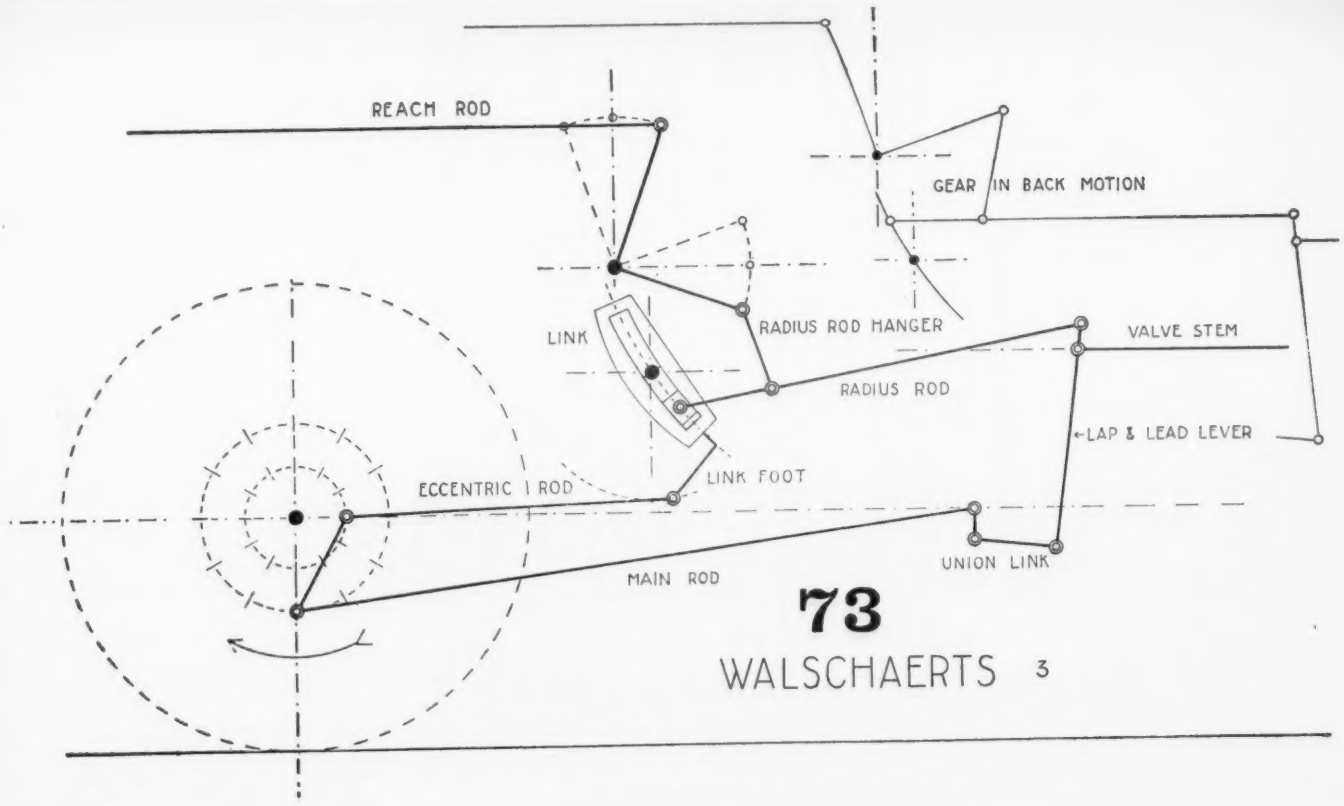
(Dwg. 73)

It is hardly necessary to go into a detailed description of this now widely used motion. Its final introduction to America, in 1904, (the first being by Mason, in the seventies) was the signal for its almost universal adoption on newly built power.

This diagram shows the arrangement of eccentric pin and lap and lead lever connection for inside admission, the usual method with piston valves. The radius rod, it will be noticed, is connected to the lap and lead lever *above* the valve stem connection; while the eccentric, or return-crank connection *follows* the main pin when running forward.

In the case of outside admission, which was universal with slide valves, and which is occasionally used with piston valves, the radius rod connection is *below* that of the valve-stem; and the return crank pin *precedes* the main pin when running in forward motion

So much has been written describing the modern Walschaerts valve motion and its functions, that it is hardly worth while to shed further light on it here.



73

WALSCHAERTS 3

STEPHENSON-MOLYNEUX.

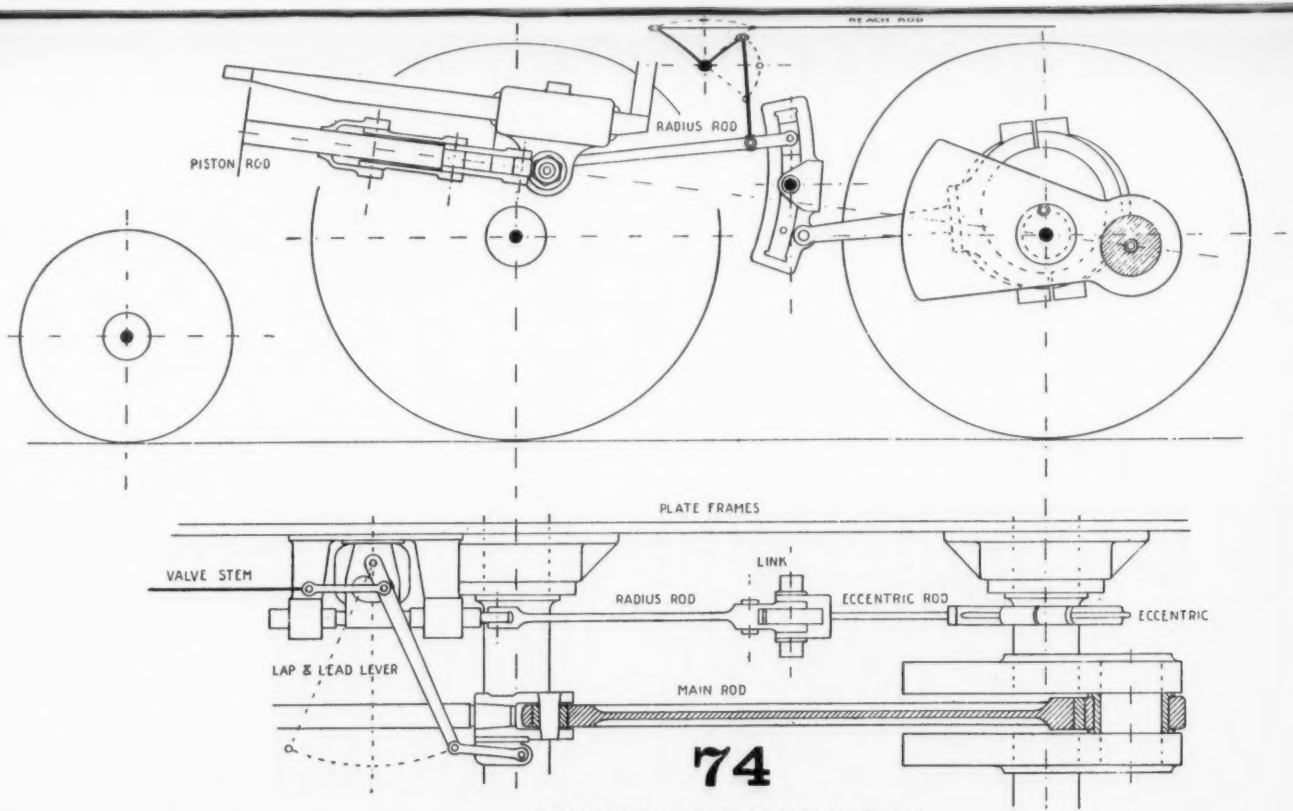
(Dwg. 74)

The Stephenson-Molyneux is not a new kind of valve motion; rather it is a means of adapting the Walschaerts gear to locomotives in which the valve chamber or steam chest is placed in other than the normal position in relation to the cylinder. This is often the case in 3-cylinder locomotives, where it is necessary to drive over the forward axle, leaving little or no room above the cylinder.

In this arrangement, which was applied to a number of Buenos Aires & Pacific 12-wheel (4-8-0) locomotives, we have a Walschaerts valve gear actuating a piston-valve, which is in the same horizontal plane as the cylinder.

Aside from the link being driven by an eccentric between the frames, the only unusual feature in the gear is the guide for the valve-stem end of the lap and lead lever. This can be readily understood by a glance at the lower drawing. The combination or lap and lead lever is a divided member with the piston rod between the two halves.

The method used here has been patented by R. Stephenson & Hawthorns, Ltd., successors to the old Robert Stephenson firm of England. Other ways of operating the valve of the inside cylinder of a 3-crank locomotive necessitate the use of an outside crank with an outside or inside link and rocker, or any of the various conjugate systems. The Joy gear has also been used for the inside cylinder, but this has not proven entirely satisfactory.



74

STEPHENSON-MOLYNEUX

HEUSINGER.

(Dwg. 75)

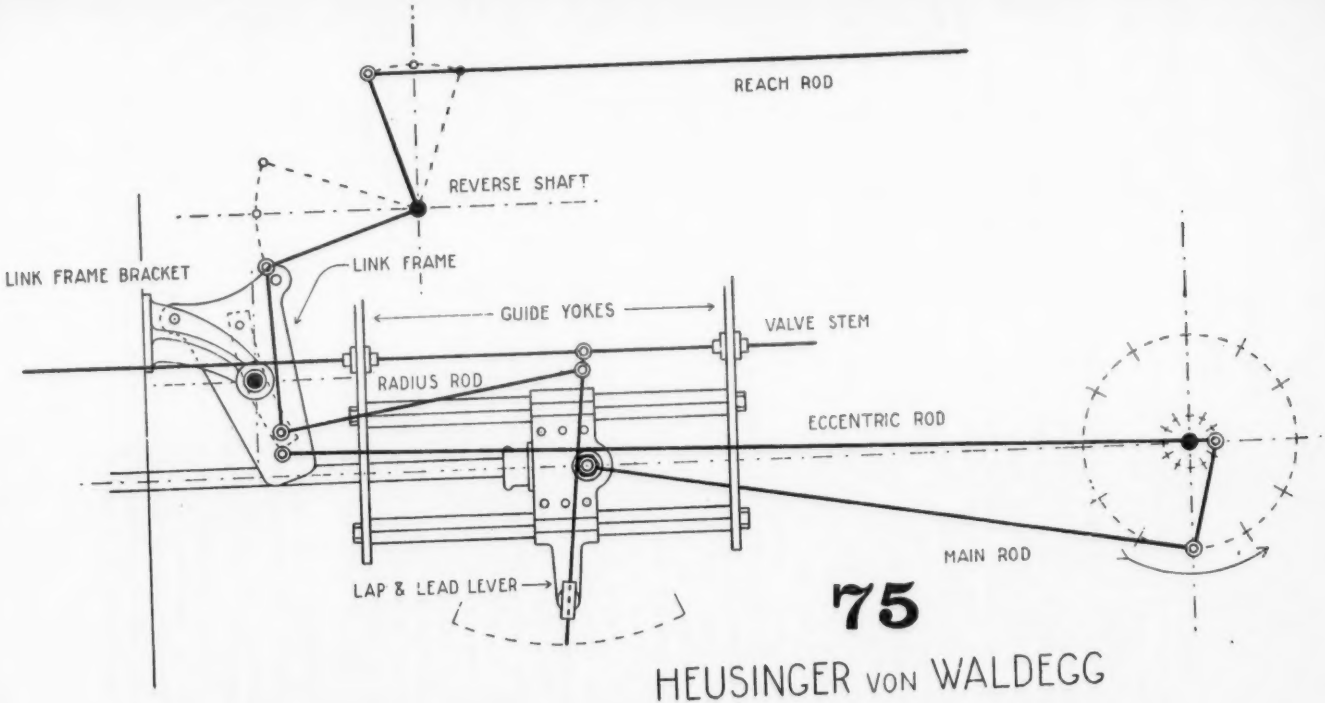
Walschaerts' first valve gear was probably intended for inside-cylinder engines, and its link was worked from an eccentric. Its earliest use was on a small single-driver passenger engine on the Belgian State Rys. The improved gear came out in 1848, and, while differing in appearance, was identical in principle with the modern variety. True, the link and radius rod are reversed in position, but the long eccentric rod tended to lessen errors due to angularity.

About a year later (1849) Edmund Heusinger, Chief Engineer of the Taunus Railway, a small line in western Germany, invented a motion so similar that for years there was controversy as to who was really entitled to the honor. The argument was finally settled by Heusinger acknowledging that Walschaerts had the head start.

The slight differences between the two gears can easily be seen. The Heusinger link is carried in a frame consisting of two flat triangular shaped sides, pivoted on a bracket. As in the 1848 Walschaerts gear, the cross-head and guides are set well behind the cylinders. Double lap and lead levers are driven directly from the cross-head, not through a union link. Being for use on outside cylinders, the drive is from a return crank.

As a reward for his inventive genius, the Prussian Government, in later years, extended to Heusinger the rank of Nobleman, and he added the "von Waldegg" to his surname. Hence we see his valve gear going by three different names; "Heusinger," "Heusinger von Waldegg" and "Waldegg". At least this held true in Germany and her now vanished dependencies.

Consensus of opinion is that Heusinger's motion was his own invention, another case of independent students discovering the same solution to a problem. Neither Heusinger nor Walschaerts received any monetary benefits from their valve gear inventions; but they saw them forge to the front, at least, insofar as continental Europe was concerned, for, in a few short years, it became the favorite locomotive valve motion in that area. England stood by the Stephenson link till comparatively recent years.



75

HEUSINGER VON WALDEGG

STEVENS.

(Dwg. 76)

Few motive power men have been honored by having bronze statues erected to their memory, and it is doubtful if any other has had this tribute paid to him by his fellow workers, as occurred in the case of A. J. Stevens.

Late in 1869, the Central Pacific Co. appointed him General Master Mechanic at the Company's main shops at Sacramento. By 1872 he had persuaded the board of directors to let him build ten locomotives. They were good engines, of the typical "American" or 4-4-0 type, but Stevens soon showed that he was not going to be bound by tradition.

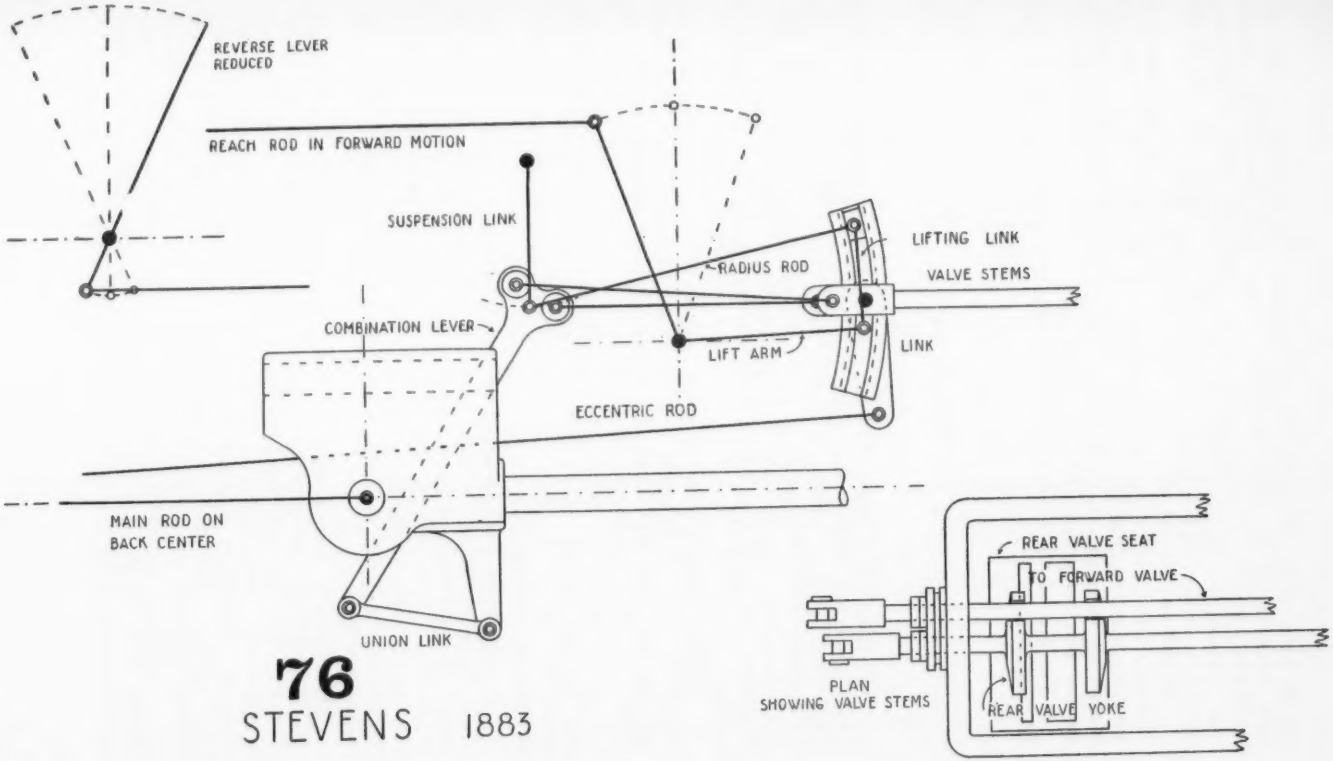
His later engines incorporated such innovations as power reverse gear, solid end rods, steam driver brakes, extension front ends, steam bell-ringer, placing the sand-box beneath the barrel of the boiler, a dropped boiler shell over the back half of the firebox, English type dome casings and of course, his distinctive system of valves and steam and exhaust ports. His C. P., S. P., and O. & C. engines set him apart from the usual run of locomotive builders.

In 1882, Stevens brought out the first of his famous twelve-wheeled (4-8-0) wood-burners, No 229, which was also built at the Sacramento Shops. Its performance justified an immediate order to the Cooke Works for twenty-five more. Among the prominent features of these engines were a long piston stroke and a new valve gear. The Stevens valve gear was, at first, the usual link motion operating two slide-valves, each of which covered steam and exhaust ports at its own end of the cylinder. One valve stem moved both valves. A third eccentric, through its rod, drove a riding cut-off valve, whose stem entered the steam chest just above the main valve stem. Independent reverse and cut-off levers were provided.

This valve gear, not illustrated here, was soon to give way to another which Stevens applied to the 4-10-0 "El Gobernador", built in 1883. In its day it was the world's largest locomotive, and its new valve gear, with a slight alteration, was to serve the C. P., S. P., and O. & C. for many a year thereafter.

In the new gear, as at first used, the separate stem and exhaust ports at each end of the cylinders were retained, each being worked from a separate valve stem. The two valve stems entered the steam chest side by side, one operating the forward, and the other the rear valve.

A glance at the motion of "El Gobernador" shows that it was of the earlier Walschaerts type, with the link ahead of the cross-head connection, and driven by an eccentric between the frames. Stevens' improvement consisted in widening out the top of the lap and lead lever to a T-shape just above its connection with the radius rod. At each end of the top member of this T are independent valve rods connecting with the two valve stems. The valves will therefore move in the same direction but, due to the oscillating movement of the two pins, they have a varying instead of a uniform rate of motion. The horizontal movement



76

STEVENS 1883

of the valve while the piston is at mid-stroke is comparatively slow. By this retarding of the valve movement, steam is retained in the cylinder until the piston has nearly completed its stroke and, what is important, the exhaust port is kept open. As the piston reaches the end of the stroke the action of the valve is very much more rapid.

Steam can be cut off at any point of the stroke, at the same time allowing free exit to the exhaust steam. So that in this arrangement we have what approaches an ideal motion; the valves opening sharply, remaining wide open, and closing quickly, combined with a protracted release and comparatively low compression.

The motion next shown incorporated a change that made the final Stevens gear.

STEVENS, II.

(Dwg. 77)

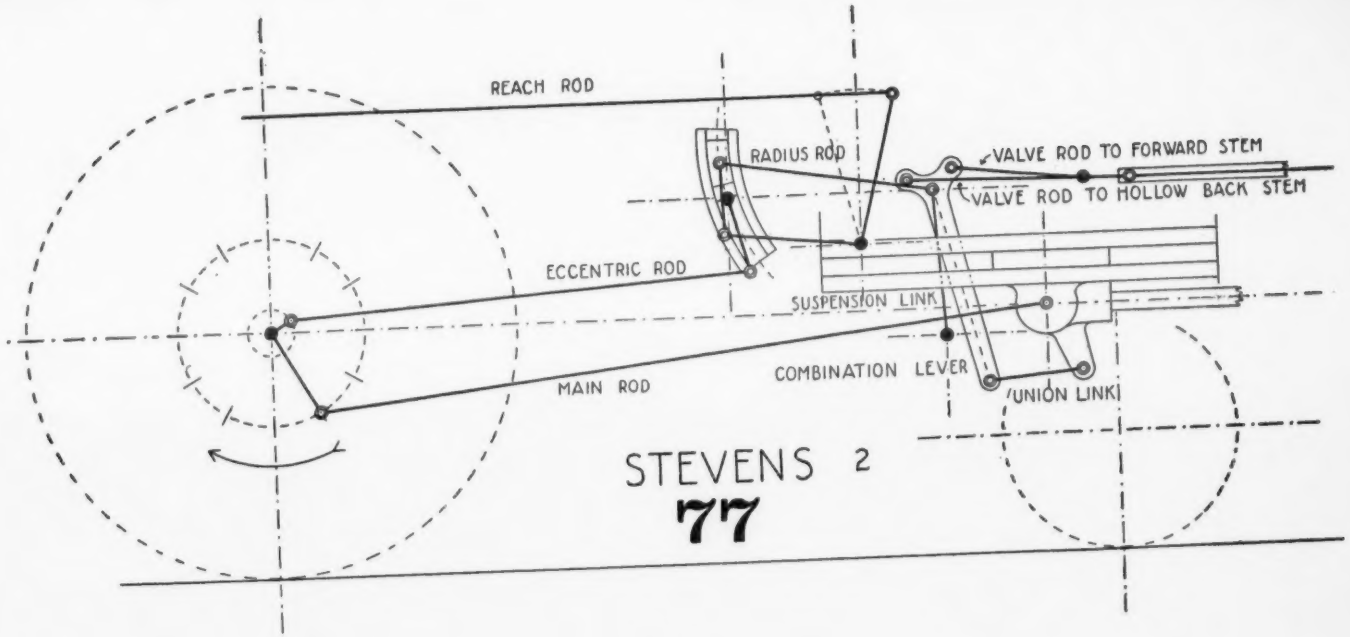
The diagram of this, the later development of the Stevens valve motion, is taken from a blue print of Southern Pacific No. 166, a fine eight-wheel (4-4-0) passenger engine with 17¼″x26″ cylinders and 68″ drivers. The 166 was built at the Sacramento shops in 1885. The engines of this class, as well as many other Stevens engines of the consolidation, 10-wheel, and 12-wheel types, were fitted with his improved motion.

At first it might be taken for a modern Walschaerts gear; but we still have the essential features of the older Stevens motion, the T-topped lap and lead lever, and the independent connections to the two valves, also the typical long steam chest.

In the later type the lap and lead lever is supported from below, and the valve-stems, instead of having two stuffing boxes, work one within the other; the back stem being made hollow, and the forward one passing through it.

As the steam-chest is somewhat inside the center line of the cylinder, the eccentric rod, instead of being connected to the link foot, is coupled to a rocker arm on the outer end of the shaft to which the link is attached. This brings the link and steam chest center in line. The new location of the link also did away with the extra long eccentric rod of the earlier motion. In forward motion the block is in the top half of the link.

After nearly twenty years as successful head of the motive power of a great system, Mr. Stevens died in 1889. What happened to the engines he built, and how were they regarded? For one thing, the men who ran them thought well of them. And here's what Angus Sinclair, editor of *Locomotive Engineering*, and a practical railroader himself, had to say:—"This valve gear was applied to many locomotives by the inventor, and had a high reputation for efficiency", also "I believe that had a company, powerful enough to push its merits before railroad officials, taken up this motion in 1883, it would have become the standard valve motion of nearly all American railroads."


REACH ROD
RADIUS ROD
VALVE ROD TO FORWARD STEM
VALVE ROD TO HOLLOW BACK STEM
ECCENTRIC ROD
SUSPENSION LINK
MAIN ROD
COMBINATION LEVER
UNION LINK
STEVENS 2
77

H. J. Small, Stevens' successor, thought otherwise, so no more engines were fitted with it. Small claimed that the first cost of the Stevens gear was greater, which was undoubtedly true. On his say-so the Stevens engines cost more for maintainance but, when the figures were all in there was a final gain of 1.68c per mile in favor of the Stevens engines as against link motion engines in the same service.

It is true that later investigation showed that some of the Stevens engines were under-boilered, and the exhaust passages were crooked and undersize, but some of them were good enough to be kept in service till 1921, with the old motion intact.

Stevens' first twelve-wheeler, the 229, later numbered 2925(S.P.) ran out of Eugene, Oregon, until 1931, but not with her original motion. She was scrapped in 1935, after fifty-three years of service. Maybe it was prejudice, possibly not, but it is odd that the Stevens gear worked well until the advent of Mr. Small; and after that it was something to be got rid of. Such things have happened before.

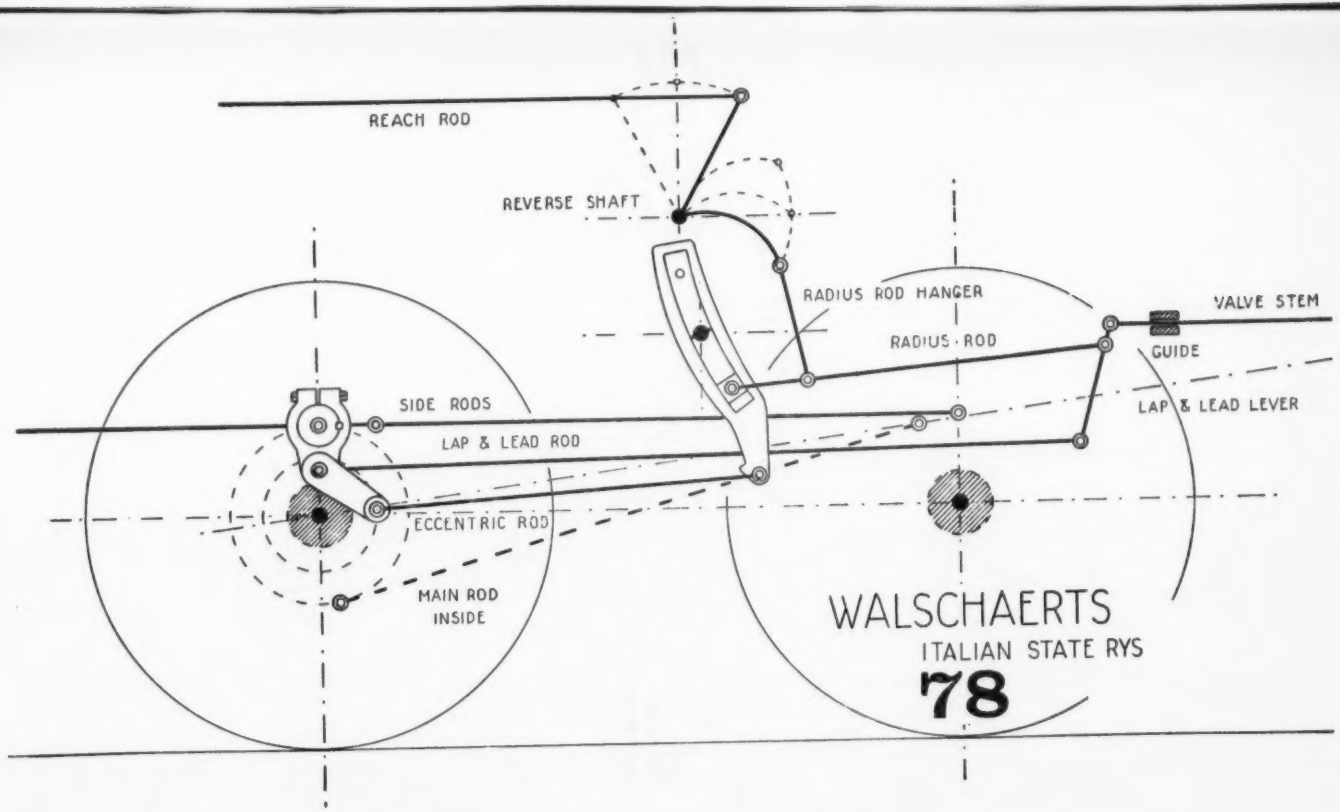
WALSCHAERTS, Italian State Railways.

(Dwg. 78)

Among the many applications of Walschaerts motion to inside cylinders is the variety used by the Italian State Railways on a large number of 6- and 8-coupled engines with pony trucks. The example shown was designed for a class of cross-compound passenger Moguls (2-6-0) in which the two cylinders took up most of the room between the frames, so that the piston valve chamber had to be placed outside.

The valves are actuated by a double return crank. The pin driving the lap and lead rod travels in a radius of about half that of the side-rod pin, while the eccentric rod is driven from the outer crank, which travels in a slightly larger radius.

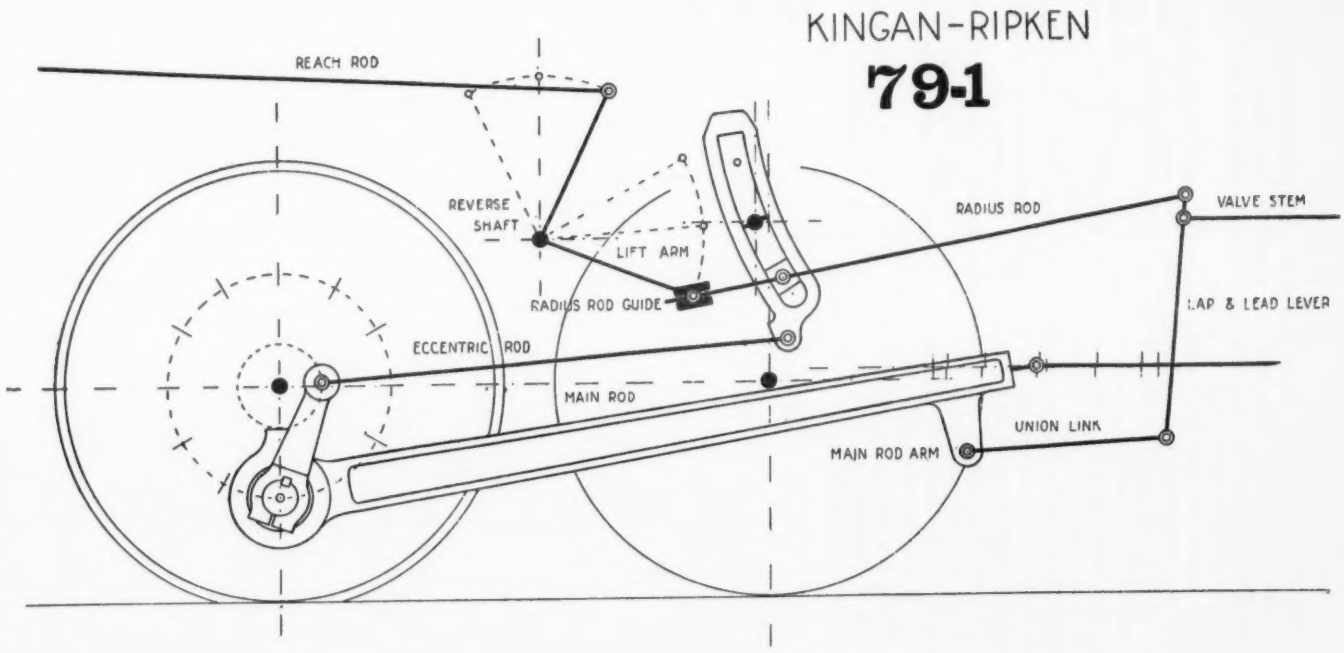
The drive shown should give steam distribution approximating that of the ordinary Walschaerts gear because, through the back end of the lap and lead rod (which in the Walschaerts gear we call the union link) describes a circle, irregularities due to its angularity should be no more than in the case of the union link driven from the cross-head, as the length of the rod takes care of this error.


REACH ROD
REVERSE SHAFT
RADIUS ROD HANGER
VALVE STEM
RADIUS ROD
GUIDE
SIDE RODS
LAP & LEAD LEVER
LAP & LEAD ROD
ECCENTRIC ROD
MAIN ROD
INSIDE
WALSCHAERTS
ITALIAN STATE RYS
78

KINGAN-RIPKEN.

(Dwgs. 79-1 and 79-2)

Just another Walschaerts motion. but without the usual cross-head arm. Instead, the back end of the union link connects with an arm on the main rod near the cross-head. This causes the valve events, release, compression, and pre-admission, to occur later in the stroke.

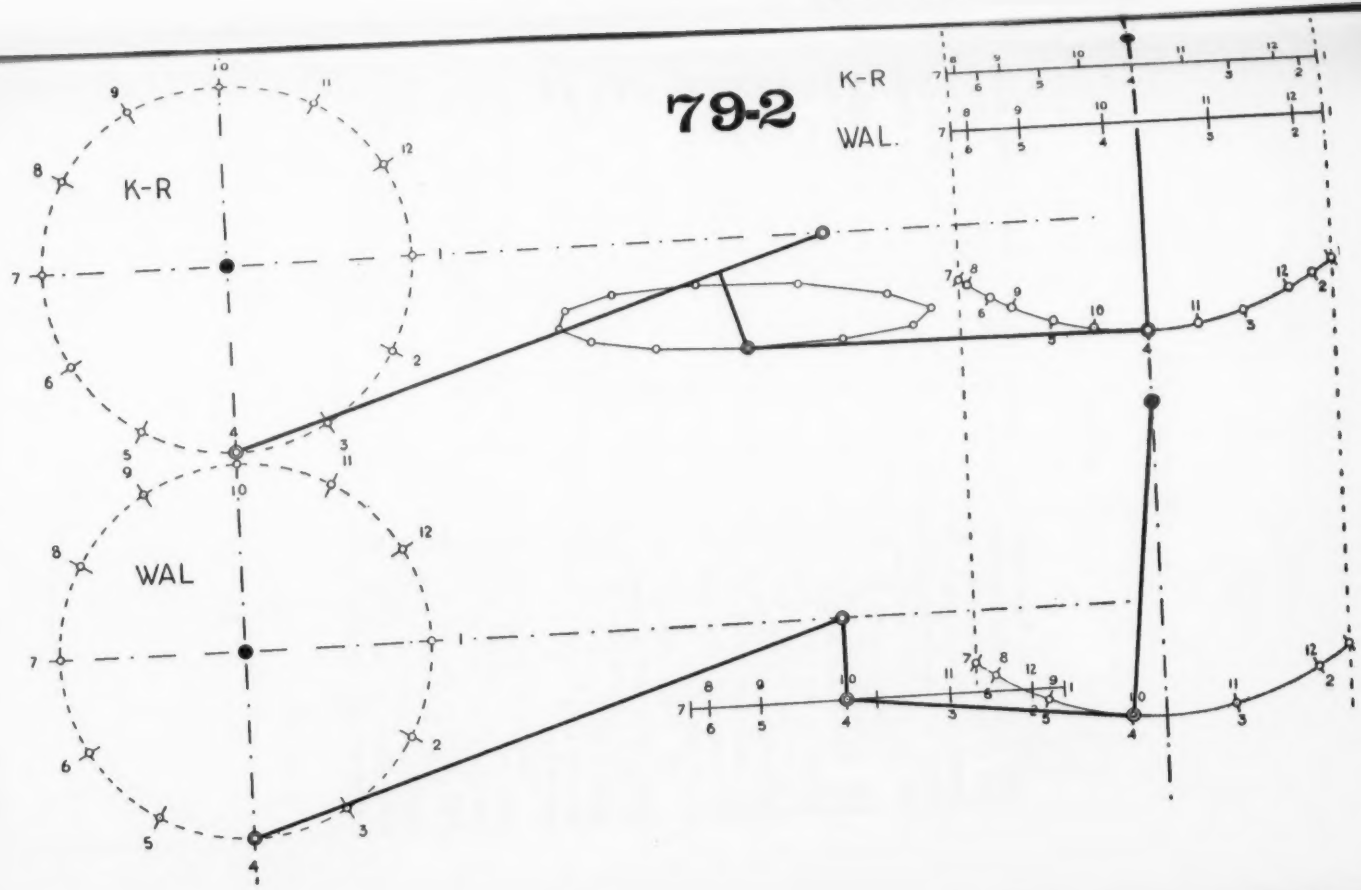

KINGAN-RIPKEN
79-1
REACH ROD
REVERSE SHAFT
LIFT ARM
RADIUS ROD
VALVE STEM
RADIUS ROD GUIDE
LAP & LEAD LEVER
ECCENTRIC ROD
MAIN ROD
UNION LINK
MAIN ROD ARM

The second diagram illustrates how this effect is brought about. To make it clearer the main rods are shown as very short (with excessive angularity), and the lap and lead lever as having a fixed fulcrum. No radius rod or valve stem is shown.

The crank-pin path is divided into twelve equal parts, each position of the pin being marked and numbered. The paths of the back and front ends of the union links are also shown. When the crank-pin is at any one of the numbered points the ends of the union link will be at the same numbered points on their paths. The points on the arcs described by the two lap and lead levers show the delay in the valve events brought about by the Kingan-Ripken as compared with the Walschaerts. These have both been carried up to straight lines in order to show their comparative positions at any given point of the main pin.

This modification of the Walschaerts motion was tried out on the Soo Line, and the writer has seen it on a Canadian National Ry. 2-8-0 locomotive, but whether it has shown any practical advantage is doubtful, for it was never applied in any numbers.

There are several motions wherein this form of main-rod arm is used, as a connection point, instead of a point directly on the main rod, to correct the timing of valve events.


79-2
K-R
WAL.
K-R
WAL

REIKE.

(Dwg. 80)

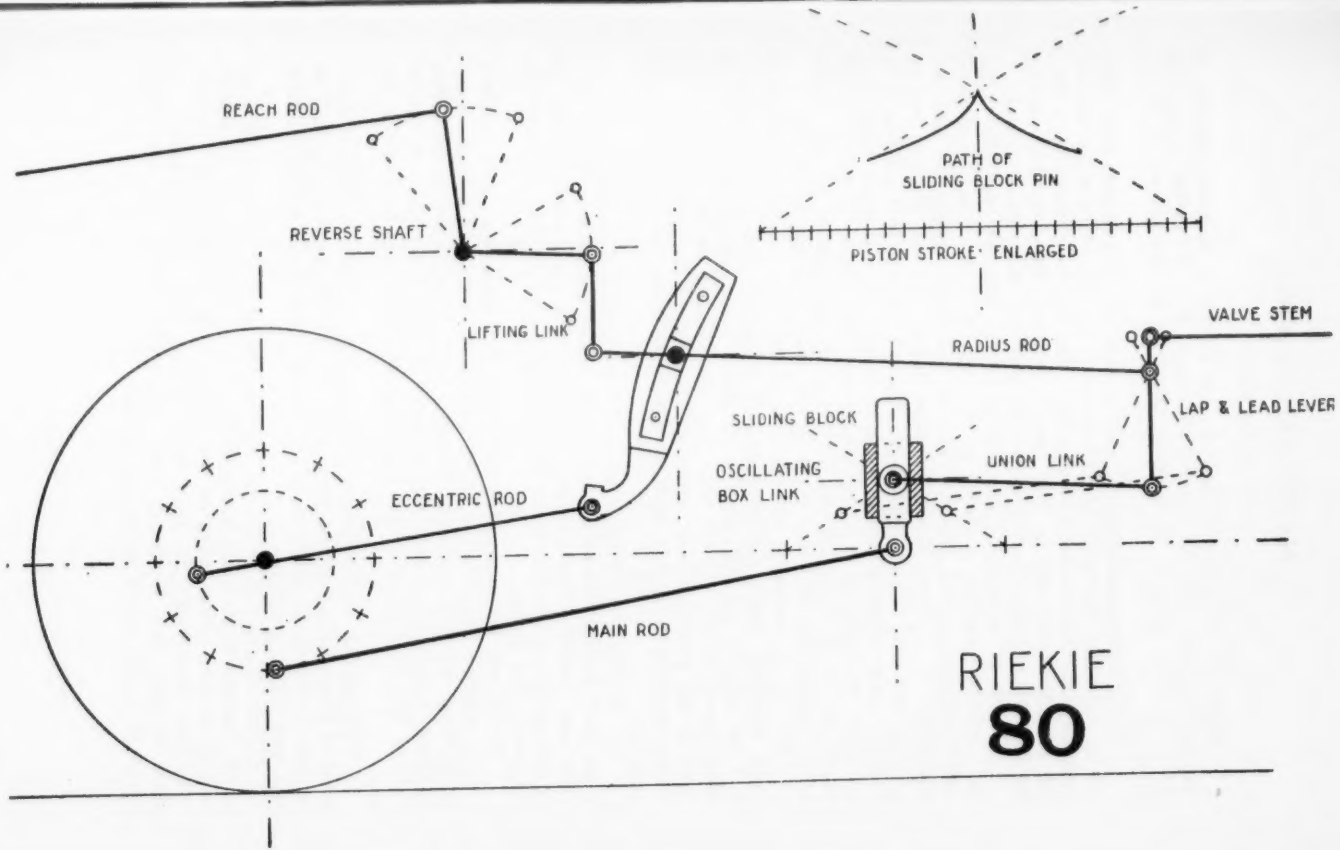
Here's one from India. Its inventor sought a motion that would give quicker port opening at admission, hold it practically constant, and make the exhaust opening late and rapid, thereby reducing compression. With ordinary valve motions these conditions cannot be met owing to retardation of the valve movement at the ends of the stroke, and the restriction of port opening when the motion is hooked up.

The means used here are a short fixed oscillating link, and a sliding bar, to the lower end of which motion is imparted from the cross-head pin. The union link is attached to this sliding bar, and its back end moves in the path shown by the upper diagram, which is drawn to double size. During one piston stroke, the pin rises to the center of the oscillating link, slowing down to reverse its motion at mid-stroke. On the other half of the stroke the motion accelerates, relative to that of the cross-head. This gives better port opening at admission and exhaust at all cut-offs.

Mr. Reike claimed for this gear that the resulting indicator diagrams gave results equal to those from Corliss engines. A. J. Stevens (of the S. P.) attempted to secure a like distribution by using two valves, each of which was driven from its respective pin at the upper end of the lap and lead lever. In the Reike gear the lap and lead lever drives only one valve.

The motions of both Reike and Stevens gave steam distribution that was a decided improvement over that of the Walschaerts gear, but the added complications involved in each case were enough to consign them to the list of "has beens".

John Reike was born in 1848 and, for many years, was Locomotive Superintendent on the Oude & Rohilkunde, and the North Western State Railways, in India. While with the N. W. S. Rys. he invented a system of compounding which was used on that system.


REACH ROD
REVERSE SHAFT
LIFTING LINK
PATH OF
SLIDING BLOCK PIN
PISTON STROKE ENLARGED
VALVE STEM
RADIUS ROD
LAP & LEAD LEVER
SLIDING BLOCK
OSCILLATING
BOX LINK
UNION LINK
ECCENTRIC ROD
MAIN ROD
RIEKIE
80

MASON-WALSCHAERTS.

(Dwg. 81)

While the Walschaerts motion here shown is, in most respects, of the conventional type for outside admission, it is of interest as showing a modification adopted by William Mason in the suspension of the radius rod.

While Mason's strenuous efforts to have the Walschaerts gear taken on by American railroads were of no avail, he did adopt it for his own specialty, the Mason-Fairlie locomotive. The Fairlie locomotive, a British invention patented in 1863, was a double-boilered machine resting on two steam driven bogies, or trucks. The cab was placed centrally.

Mason, after building one Fairlie of the English type, the "Janus", concentrated on a design of his own. This consisted of a single boiler locomotive with cab and tank on the same frame; the rear end supported an ordinary 4- or 6-wheeled truck, and the forward end by another truck which incorporated cylinders, drivers and pilot and, at times, a pony truck. Flexible joints were used on the steam pipes, and a flexible reverse gear in order that steam distribution in the cylinders might not be seriously affected by the changing position of the engine truck beneath the boiler or main frame when running on curves.

During the seventies and eighties Mason built a sizable number of these so-called Mason-Fairlies for both standard and narrow gauges, and the greater part of them were fitted with this slightly modified Walschaerts motion. At the time they were almost the only representatives of this gear in North America, if we except its application to the Rotary snow plow engines made by the Cooke Works, of Paterson, in the nineties.

The Mason plan of suspension of the radius rod consisted of a reverse shaft resting across the top of the boiler, permitting the use of a very long hanger. This naturally resulted in a very slight amount of misplacement of the link block due to lateral movement of the truck in relation to the boiler.

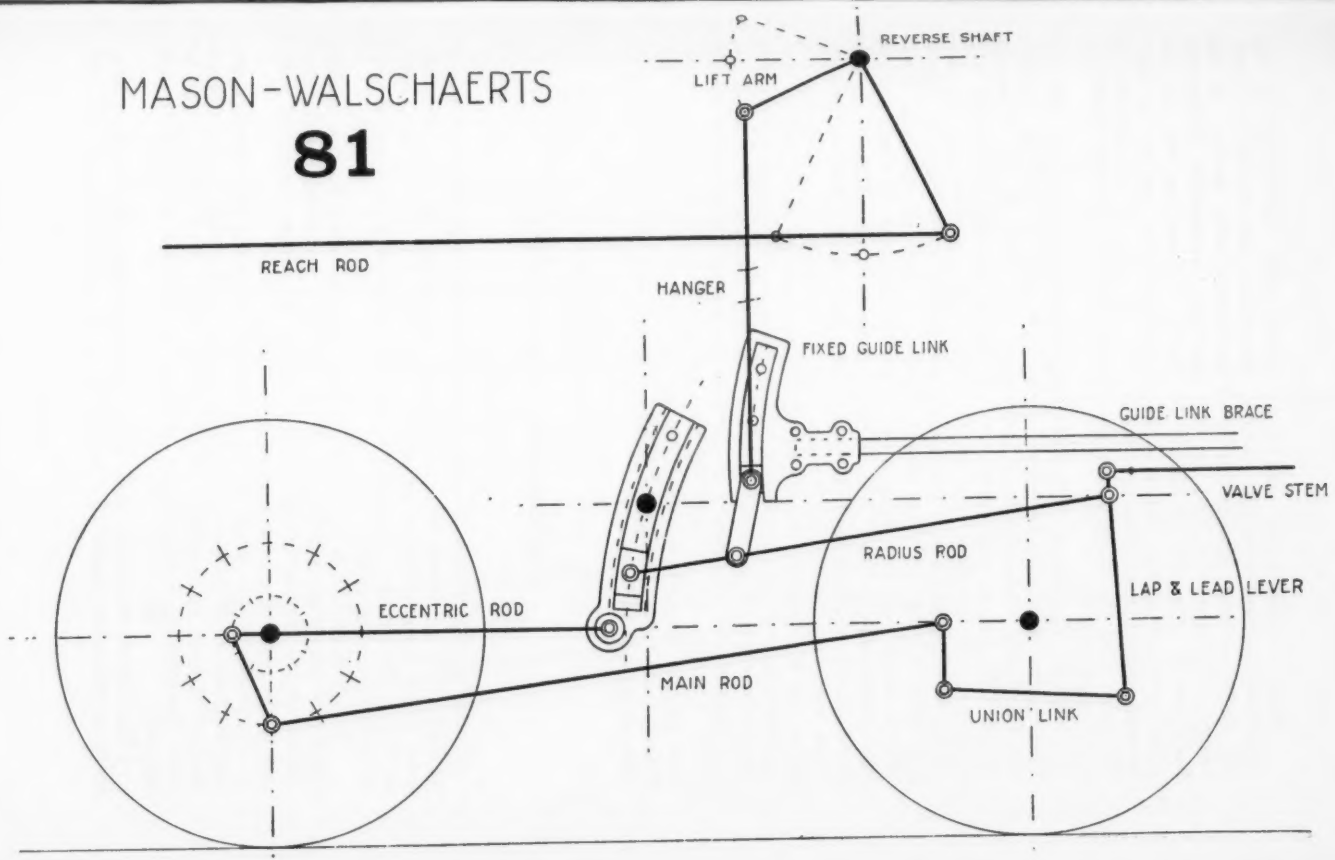
The hanger is connected to the radius rod through a short auxiliary hanger which swings from a block. This block travels in a fixed curved guide when being reversed or "hooked up". A ball-joint is used. This auxiliary hanger is of such length that the slip of the block in the reversing link is reduced to the minimum when running in forward motion.

Whether due to the design of the motion, or to the general excellence of these little engines, they were remarkable performers, both as to their speed, their ability to handle heavy loads, their steady running and easy riding qualities.

Mason apparently made no application of the Walschaerts gear to his famous eight-wheel locomotives, whether because of the opposition of motive power men, or his feeling that its use might detract from their good looks, for they were by long odds the handsomest engines of their day. Certainly their appearance would not have been improved by the use of an outside motion.

MASON-WALSCHAERTS

81



Note. A number of writers of recent years, uninformed on the American locomotive and its history, have fallen into the error of stating that the first application of Walschaerts valve motion in this country was made in 1904, on the American Locomotive Company's Baltimore & Ohio 0-6-6-0 Mallet, No. 2400. We may as well lay this ghost by referring the reader to Mason's Fairlie type engines on which he used Walschaerts gear as early as 1877. Stevens, of the Central Pacific, also used the Walschaerts gear as the basis of his own valve motion, from 1883 on.

Editor's Comment: The first Mason locomotive equipped with the Walschaerts valve gear was his No. 536, built Sept. 5, 1874 for the Boston, Clinton & Fitchburg R. R. and named the "Wm. Mason." Because of the closeness of the drivers to the piston guides, Mason had had difficulty with the valve stem of the Stephenson gear. Between the date of the building of his first Fairlie and not including the "Janus", Mason had built thirteen of these single Fairlie's before he used the Walschaerts valve gear and he applied it to the majority of these engines built subsequent to the "Wm. Mason." However, according to the late Fred Colvin of Philadelphia, with whom your editor was acquainted, there were two locomotives on the Lehigh Valley R. R. equipped with either the Walschaerts valve gear or one very similar to it. Mason, who was building several ten-wheelers for the Lehigh Valley and visited that road to witness their performance, could have brought the idea of this valve gear home with him. I can neither confirm nor deny the statement of Mr. Colvin's—I can only say that his statements were usually accurate and, if the Lehigh Valley did not use this or a similar gear, Mr. Mason was a close reader of the mechanical journals and they could have given him the idea.

WALSCHAERTS, Variable Lead.

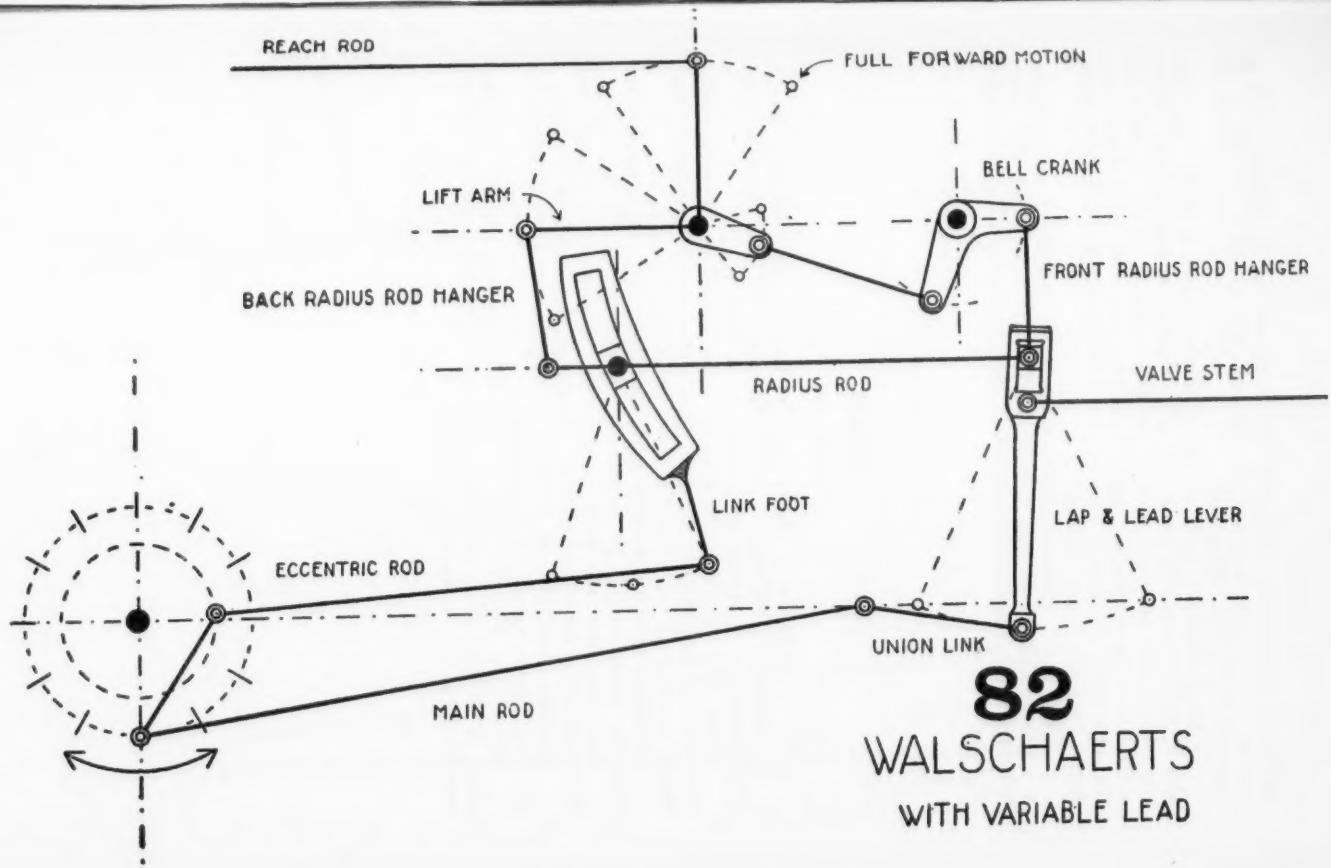
(Dwg. 82)

Long and loud have been the arguments between the advocates of variable lead in locomotive valve gears and those favoring constant lead. There is something to be said for each side, but we will not bother to discuss the problem here save to say that variable lead tends to make an easier starting engine.

While Walschaerts is a constant lead motion, other factors, including light weight, accessibility, and the necessity for heavier and better braced engine frames, brought it into use as the almost universal gear; and it has given a splendid account of itself.

On roads where power is loaded to near capacity, and much starting of trains is to be done on heavy grades, a decrease in the normal amount of lead at starting is undoubtedly helpful. With this end in view, the attachment shown was designed by the Denver & Rio Grande Western.

This device varies the lead, as in the Stephenson gear, from a minimum at the latest cut-off to a maximum at the mid-position of the link


REACH ROD
FULL FORWARD MOTION
BELL CRANK
LIFT ARM
FRONT RADIUS ROD HANGER
BACK RADIUS ROD HANGER
RADIUS ROD
VALVE STEM
LINK FOOT
LAP & LEAD LEVER
ECCENTRIC ROD
UNION LINK
MAIN ROD
82
WALSCHAERTS
WITH VARIABLE LEAD

blocks. It consists of a rod from the short arm on the reverse shaft to one on a bell crank, and another from the bell crank to the pin at the forward end of the radius rod.

When hooked up as shown, the radius rod block is at the top of its slot in the lap and lead lever, and gives the full amount of lead. When the reverse lever is in full forward or back position, the radius rod block moves down to a position much closer to the valve stem connection. This decreases the lead at the time when full power is needed for starting or for slow, heavy pulling.

Whether the gains secured are worth the additional complication is a question, for, while the D. & R. G. W. seems to have found it a satisfactory arrangement, other mountain roads do not seem to have adopted it.

KITSON.

(Dwg. 83)

This modification of Walschaerts motion was first used by Kitson & Co., locomotive builders of Leeds, England, and was fitted to many small tramway, or street, locomotives, from 1879 on.

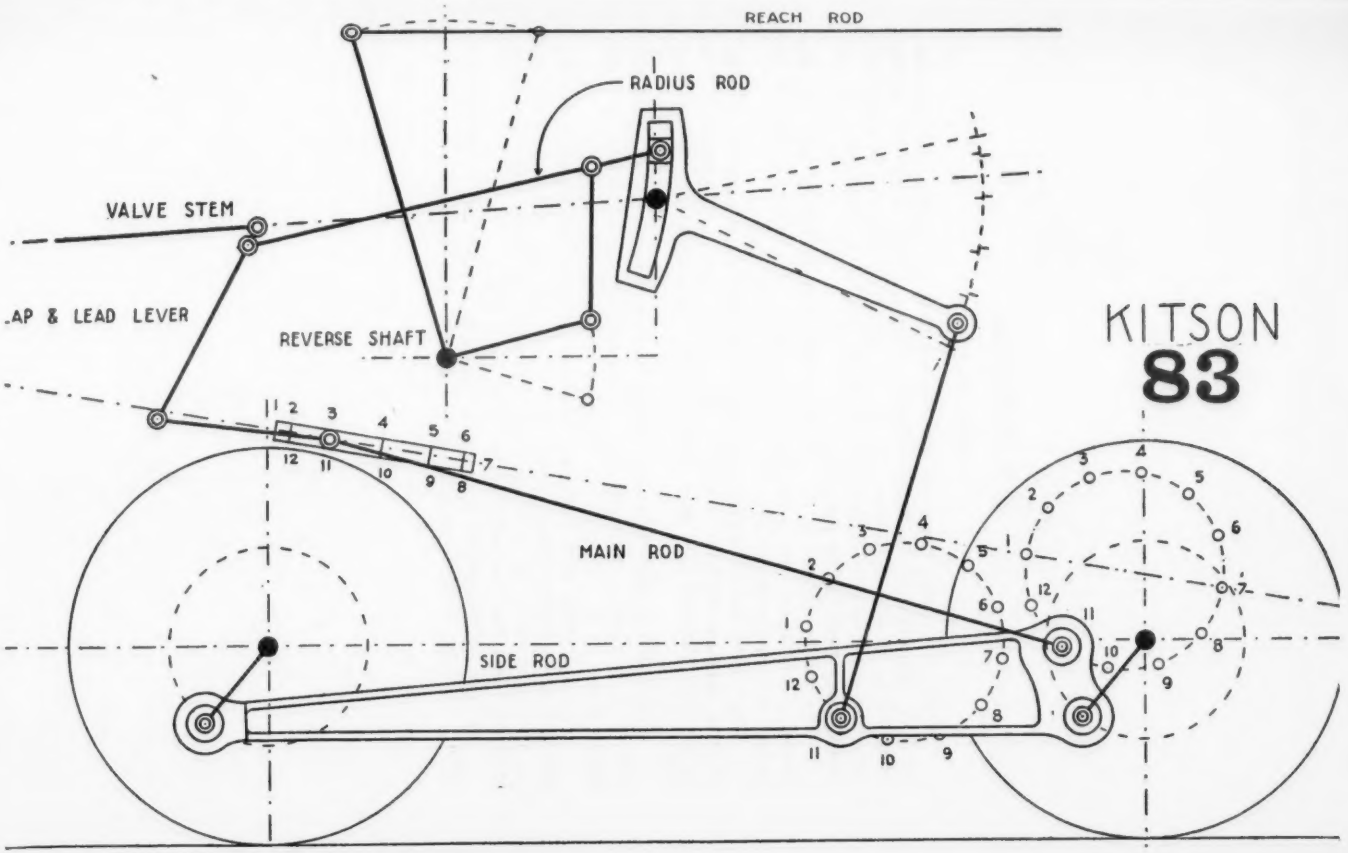
These little four-wheeled engines were housed in for city traffic. In order that they may be operated from either end, reverse levers were located at the rear end as well as the at the tumbling shaft.

Cylinders were placed quite high, and the union link drove directly from the cross-head pin to actuate the lap and lead lever.

The link drive was from a point on the deep I-section side rod just in front of the rear driver, to a long arm at the rear of the link.

Further description of this gear is unnecessary if the working of the Walschaerts motion is understood.

These little 8″ x 12″ engines gave a satisfactory account of themselves until 1904, when they became increasingly displaced by the advent of electricity in the street-car field.


REACH ROD
RADIUS ROD
VALVE STEM
.AP & LEAD LEVER
REVERSE SHAFT
MAIN ROD
SIDE ROD
KITSON
83

J. T. MARSHALL.

(Dwg. 84)

This valve gear, based on the Walschaerts principle, was invented by J. T. Marshall, of the Boyne Engine Works, Leeds, England, shortly after 1900. It was first tried out on the Great Northern, in 1902, and later on the Great Southern & Western (Ireland), in both cases on locomotives with inside cylinders.

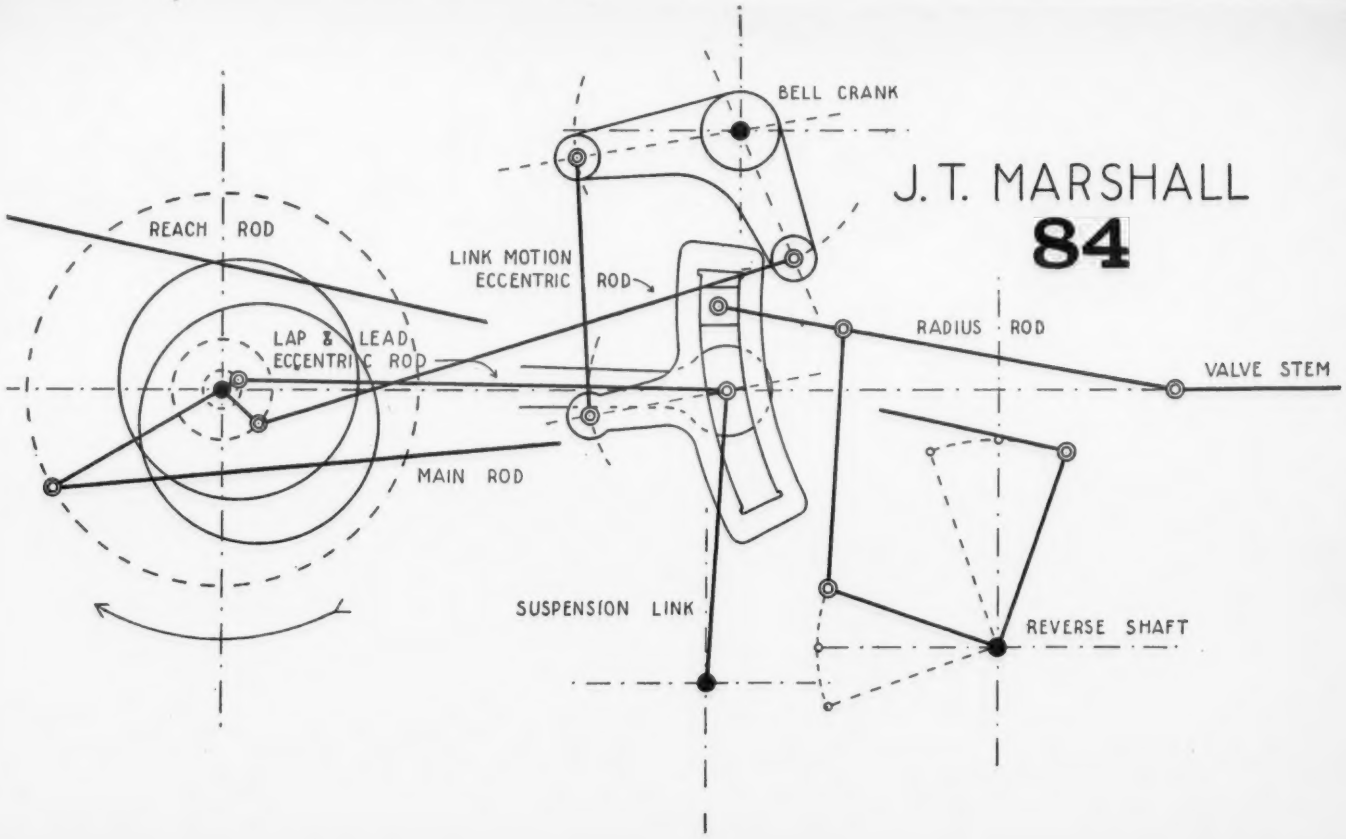
The design shown is for direct motion but it can be adapted for steam chests above the cylinders by coupling the forward end of the radius rod to the lower arm of a rocker.

Instead of the eccentric and crosshead connections usual in Walschaerts' motion, we have two eccentrics, the one with the greater throw connecting through the bell crank to give the link its port opening movement.

The link trunnion is at the upper end of a suspension, or anchor, link, and is given a constant lead movement by the eccentric with the lesser throw.

To all intents and purposes we have here a Walschaerts motion, arrived at in a roundabout way, and while reports of its performance on a number of G. S. & W. passenger locomotives were very flattering, it never made any inroads in the valve gear field.

It may be mentioned in passing that this motion has no connection with a variety of Hackworth gear having the same name.


BELL CRANK
J.T. MARSHALL
84
REACH ROD
LINK MOTION ECCENTRIC ROD
LAP & LEAD ECCENTRIC ROD
RADIUS ROD
VALVE STEM
MAIN ROD
SUSPENSION LINK
REVERSE SHAFT

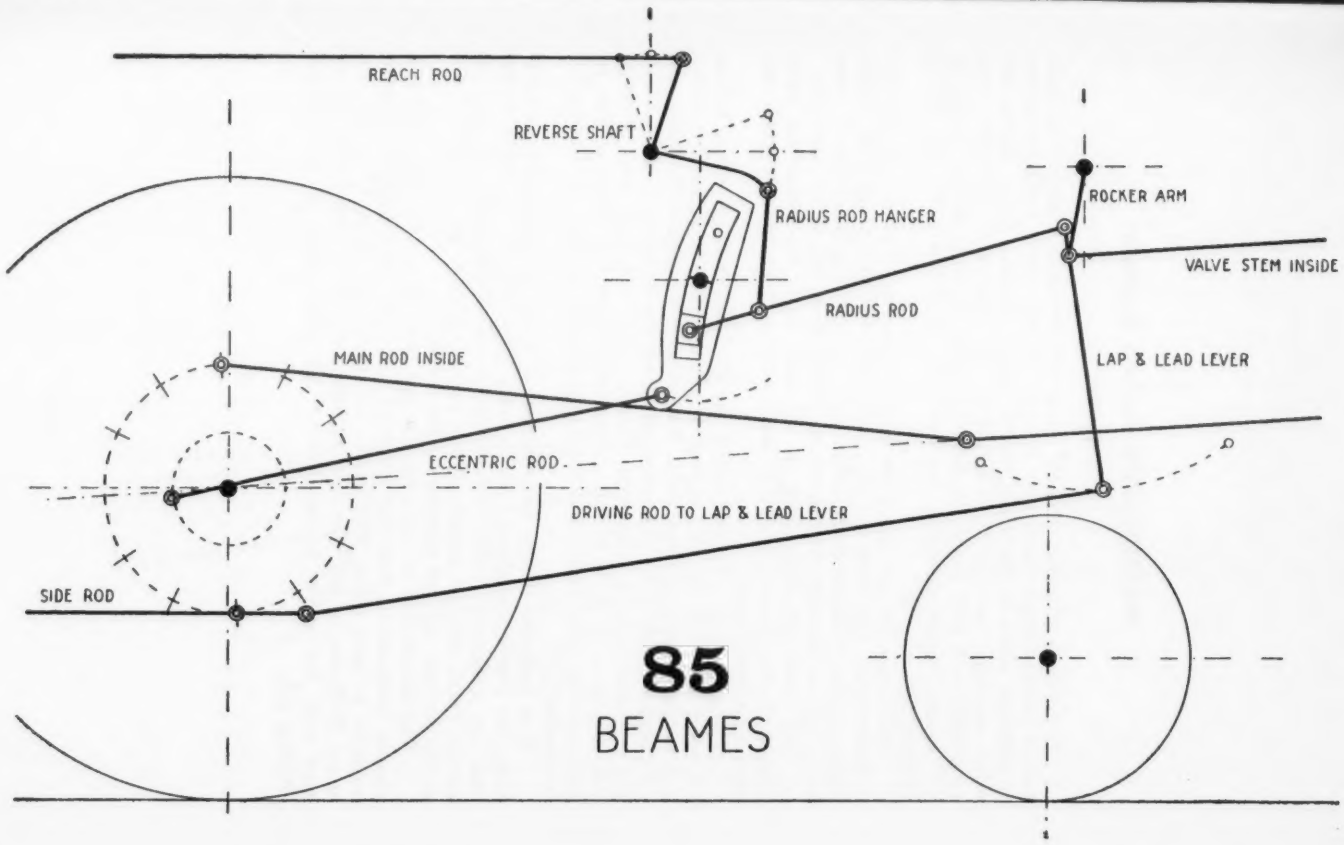
BEAMES.

(Dwg. 85)

Just another Walschaerts gear, but with a different drive for the lap and lead lever. As with a number of Italian State Rys. 2-6-2 and 2-8-2 inside-cylinder engines, this is for an inside cylinder machine; but where the I. S. Ry. engines' piston valve chambers were outside the frames, this one has both cylinders and valve chambers between the frames.

The locomotive was a London & North Western Ry. 10-wheeler on which the main rods drove through the front axle. Designed by the company's Mechanical Engineer, Capt. H. P. M. Beames, in 1923, the arrangement does not appear to have been used to any great extent. It is, however, a satisfactory solution where there is a combination of Walschaerts motion and inside cylinders, as it allows for thicker webs on the crank axle, and rids the space between the plate frames of hard-to-get-at moving parts.

In the example shown the lap and lead lever intermediate pin fulcrums on a guide rod to which the outer arm of the rocker is attached. An inner arm connects with the valve stem. The link gets its port opening movement from an inside eccentric, while the back end of the lap and lead lever connects with a short extension at the forward end of the side rod.


REACH ROD
REVERSE SHAFT
RADIUS ROD HANGER
ROCKER ARM
VALVE STEM INSIDE
RADIUS ROD
MAIN ROD INSIDE
LAP & LEAD LEVER
ECCENTRIC ROD
DRIVING ROD TO LAP & LEAD LEVER
SIDE ROD
85
BEAMES

WALSCHAERTS. Baldwin 3-cylinder

(Dwg. 93)

If the lines of meter and 42″ gauge be included, a surprising number of narrow-gauge 3-cylinder locomotives have been built for service in different parts of the world. South Africa, Brazil, Siam, Japan, and other countries use the three-cylinder arrangement on different types from 4-6-2 to 2-10-2, the accompanying sketch showing that of a class of 42″ gauge Pacific passenger engines built by Baldwin for the Manila Railway Co., in 1927.

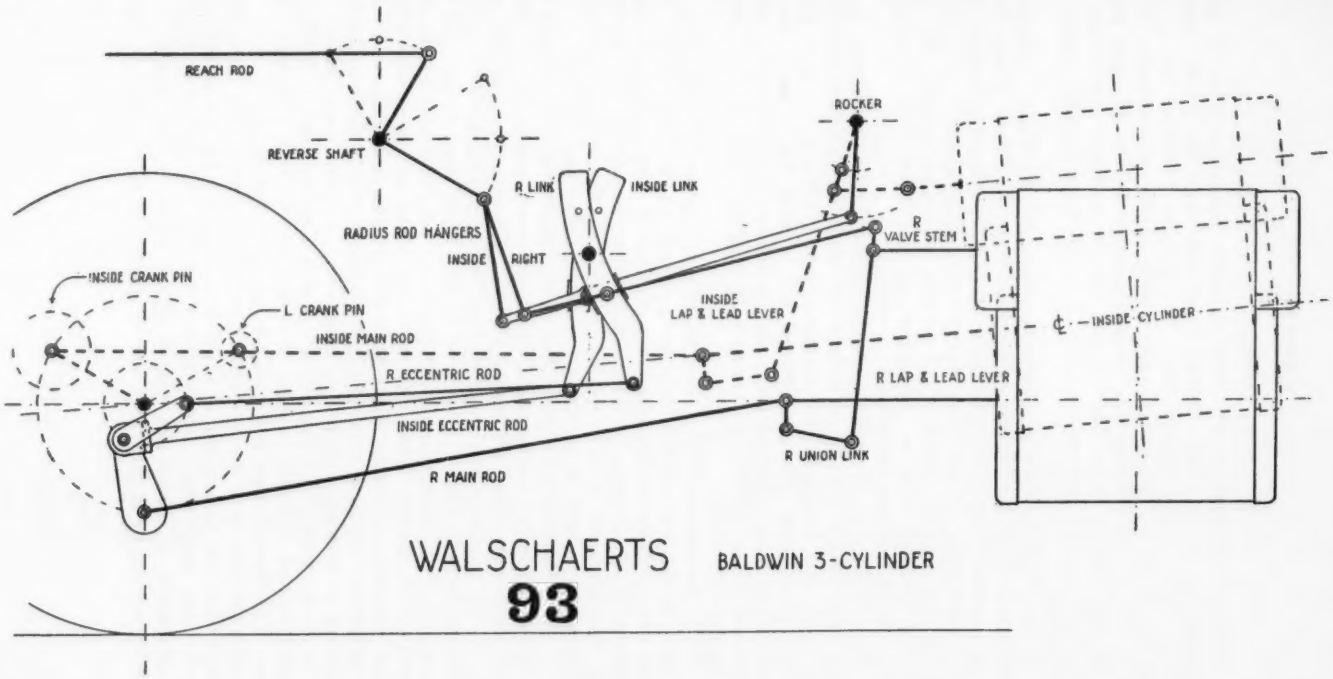
Seen from the left side these engines seem to be of the normal two-cylinder type, but from the engineers side, the first thing that strikes one is a pair of Walschaerts links in the conventional link support, these being driven through double return cranks from the right main pin.

All three cylinders drive on the same axle, the inside one being slightly inclined to clear the forward axle, a Dean type of guide and crosshead being used.

The return, or eccentric, crank for the inside motion, which follows its main crank-pin by 90 degrees, is connected by the usual eccentric rod to the inner of the two links. Its radius rod operates the outer arm of a rocker shaft, to the other arm of which the upper end of the inside lap and lead lever is connected. This lap and lead lever and its union link are the only parts of the motion underneath the boiler, so that repairs can be easily made, and the narrow space between the frames left uncrowded.

It is doubtful if this arrangement is more complicated or weighty than the Gresley conjugate levers, and it is, without question, better than an additional inside valve-gear. Another advantage is that the return crank for the motion of the inside cylinder can be placed correctly for any desired spacing of the crank.

The illustration of this gear has not been drawn to scale, and it is simply intended to show the parts of the right- and inside-motions in relation to each other. The motion on the left side is, of course, the usual Walschaerts gear for that cylinder, and is not connected in any way with the others except through its attachment to the common driving axle.



WALSCHAERTS

BALDWIN 3-CYLINDER

93

GRESLEY.

(Dwg. 94)

First a little history. The three-cylinder locomotive is not a recent development, for, in 1846, George Stephenson and his pattern maker, William Howe, patented and built two engines in which two outside cylinders drove on the same quarter, the inside crank being on its center. The inside cylinder was proportioned to deliver the same power as the two outside ones. This design was to overcome oscillation, or yawing motion due to outside cylinders, and these engines proved to be very fast.

In the '70s and '80s of the last century, F. W. Webb, Locomotive Superintendent of the London & North Western Ry., built a large number of 3-cylinder compounds in which two high-pressure cylinders, with cranks quartering, powered the rear drivers, while a single low-pressure inside cylinder drove the forward drivers. These locomotives were not equipped with side rods, so that balancing due to the relative positions of the cranks was not considered.

The inability to perfectly balance a two-cylinder locomotive at all speeds resulted in the use of both three- and four-cylinder machines. Both three- and four-cylinder compounds were, for a time, quite popular but, at least in America, passed out because the savings due to compounding were achieved more simply through super-heating, while a more scientific approach to counterbalancing has done much to lessen the hammer-blow evil.

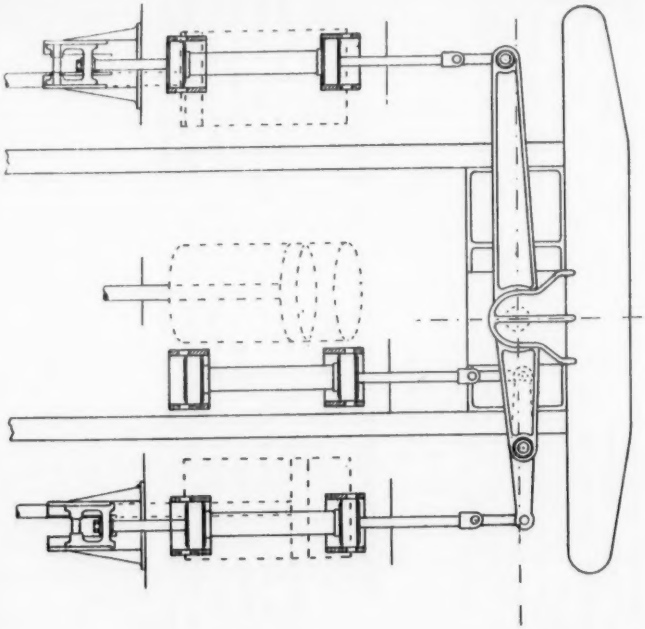
While the three-cylinder locomotive gave as perfect balancing as the four-, it also had other advantages; it gave a more even torque, and a more even pull on the fire due to six, instead of four, exhausts to each revolution of the drivers. In America, another reason was the inability to get two cylinders of sufficient size outside the frames and inside the loading gauge, where large non--articulated power was needed.

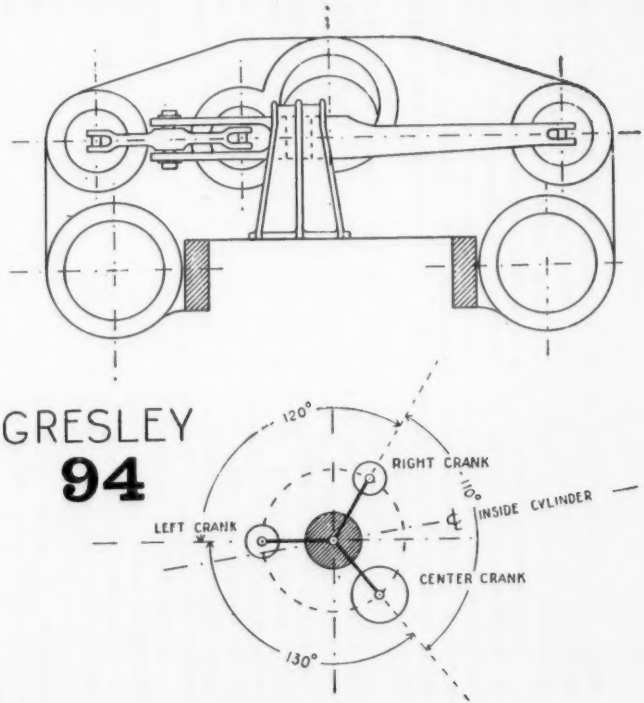
In 1894, Baldwin built three 3-cylinder simple, balanced Moguls for the Erie & Wyoming Valley road. Their valve motion consisted of three sets of Stephenson gear, all cranks being on the same axle, and all cylinders in line, inclined at the same angle, which was sufficient to permit the inside drive to clear the front axle. The three were spaced 120 degrees apart. Two steamchests were placed on the right side of the saddle and one on the left. What with the inside crank and three sets of link motion the main axle must have been pretty well crowded.

Reports at the time were that these engines gave a good account of themselves as starters and pullers; however, no more were built.

In more recent years the Philadelphia & Reading used a 3-cylinder simple balanced Atlantic (4-4-2) with 80″ wheels and 18½″x24″ cylinders. Walschaerts gear was used outside and Joy inside.

Another plan is to use two return cranks, eccentric rods, and links, on one side of the engine, one of these being used for the inside cylinder. All of these plans were more or less cumbersome and complicated, and eventually a mechanism was designed whereby the inside valve could be worked by a conjugate motion from the right and left valve-




GRESLEY
94
120°
RIGHT CRANK
10°
INSIDE CYLINDER
LEFT CRANK
CENTER CRANK
130°

stems. This was first used by the Prussian State Rys. and afterwards perfected by Nigel Gresley, of the Great Northern Ry. (England) into practically the design shown in our illustration.

A number of variations can be worked out on the principle shown. A two-to-one lever is pivoted between the frames, and the long end coupled to the left valve-stem extension. The short end of this lever carries a floating lever which connects with the right- and inside-valve-stems, so that the movements of the right- and left-valves combine to drive the inside valve.

The design shown, which has been used on a large number of 4-10-2 and 4-12-2 engines on the Southern Pacific and Union Pacific, while not giving a crank spacing of exactly 120 degrees, does permit the use of this conjugate gear. Owing to the horizontal position of the outside cylinders and the fact that the inside driving gear has to clear the forward axles, the angle of the inside crank is 110 instead of 120 degrees ahead of the right crank when running forward. While this does not materially affect steam distribution, it does make for a slight unevenness in torque, hardly enough though to be of significance.

A number of 3-cylinder engines have been built for British and European roads, with a slightly different arrangement of levers behind the cylinders, based, however, on the same principle as that shown, but working through rockers and levers. This is necessary where the cylinders are in line horizontally, the valve chambers above the two outside cylinders and where, for lack of room, the inside valve chamber cannot be placed above its cylinder. This, of course, gives a 120 degree spacing between the cranks, and neither steam distribution nor torque is affected.

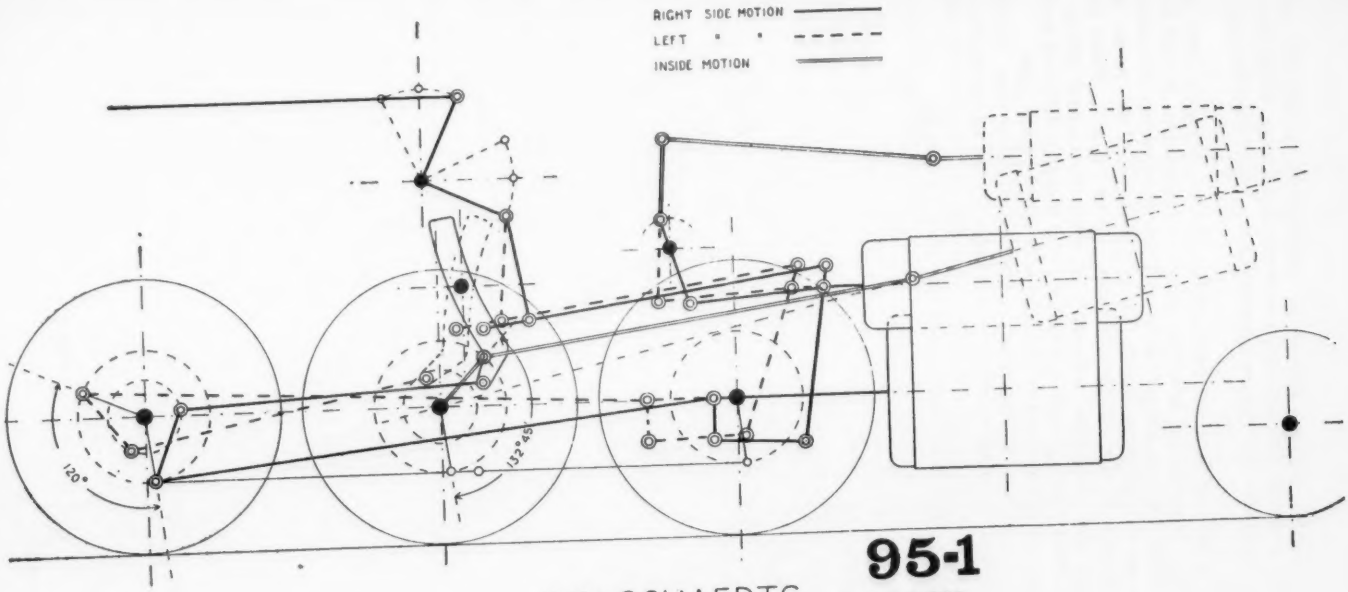
The principle used by Gresley and others was advocated by Prof. Madamet, a French Engineer, in 1887. Earlier still, conjugate gears for both locomotive and marine three-cylinder engines were patented by David Joy, in 1884 (English patent No. 14107). Joy was also the inventor of the valve motion bearing his name, and which was based on the Hackworth principle.

Lastly, Vincent, of the American Locomotive Co., also patented a conjugate motion, this in 1912.

WALSCHAERTS. 3-cyl., Eastern Ry. France.

(Dwg. 95)

After World War One, reparations paid by Germany to France consisted, in part, of locomotives. Of these, the Eastern Ry. received five Saxon State Ry. decapods. These were fitted with a conjugate gear to actuate the piston valve for the inside cylinder. While apparently different in appearance from the Gresley system of levers, it is based on the same principle, and was first used on the Prussian State Rys., about 1914.



95-1

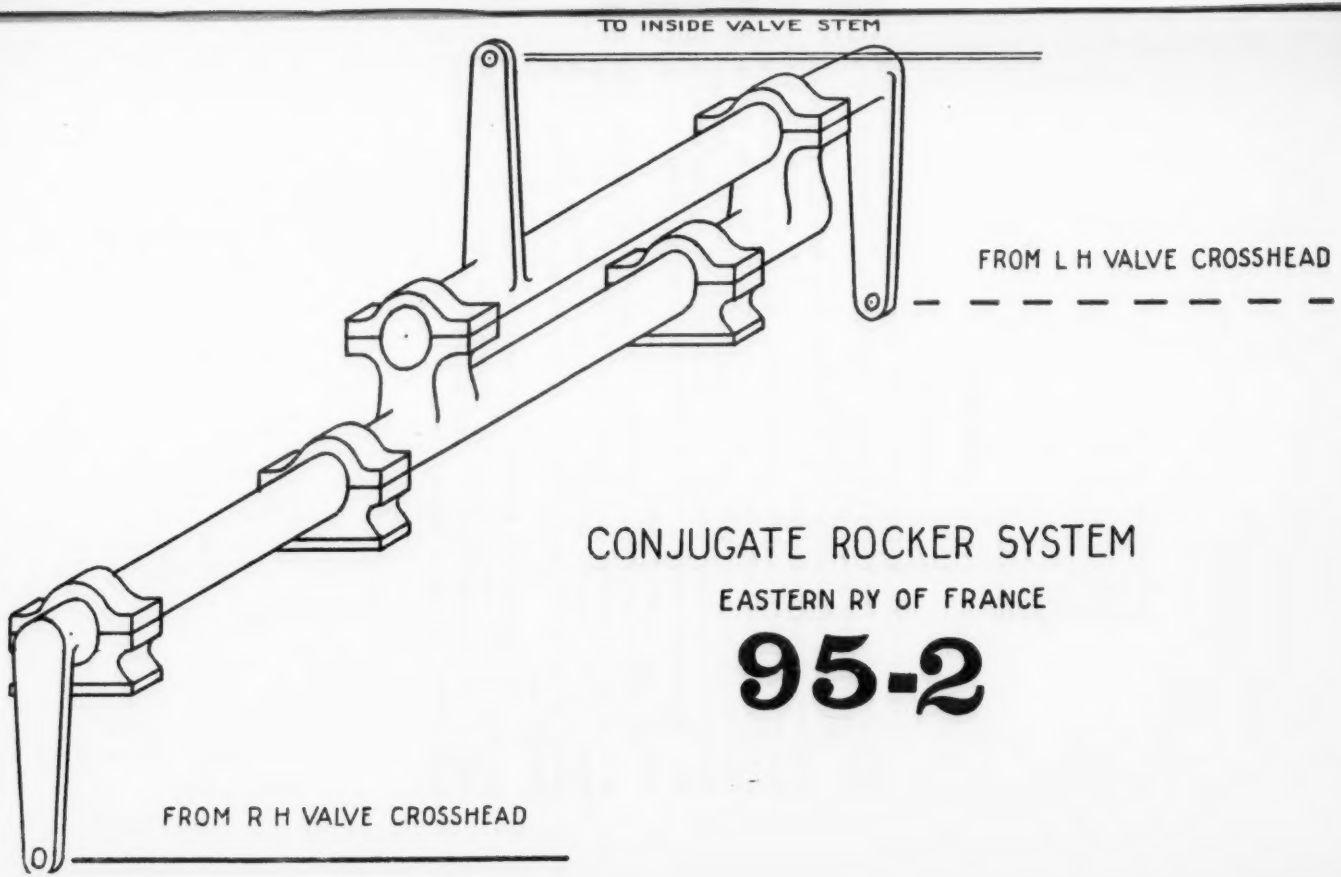
WALSCHAERTS 3-CYLINDER

EASTERN RY OF FRANCE

These 2-10-0 engines proved so satisfactory in service that the Eastern Ry. ordered 125 more of a very similar design, while the duplicates were built for the Alsace-Lorraine Rys., other French, and Algerian lines.

As it is difficult to show the working of the conjugate lever system in the larger diagram an isometric sketch is appended. It will be seen that the rocker arm on the left side, and the one driving the inside piston valve are of the same length. On the right side, the rocker arm is twice the length of the distance between the two shafts. These proportions satisfy the conditions necessary to give the central piston valve its correct travel and, though arrived at by a slightly different mechanical arrangement, give identical results with the Gresley gear.

It should be remembered that, regardless of their size, the central rocker arm and its outside rocker are always of the same length, while the rocker on the other side is twice the length of the distance between the two shafts. The same holds with the Gresley system.



CONJUGATE ROCKER SYSTEM

EASTERN RY OF FRANCE

95-2

VINCENT.

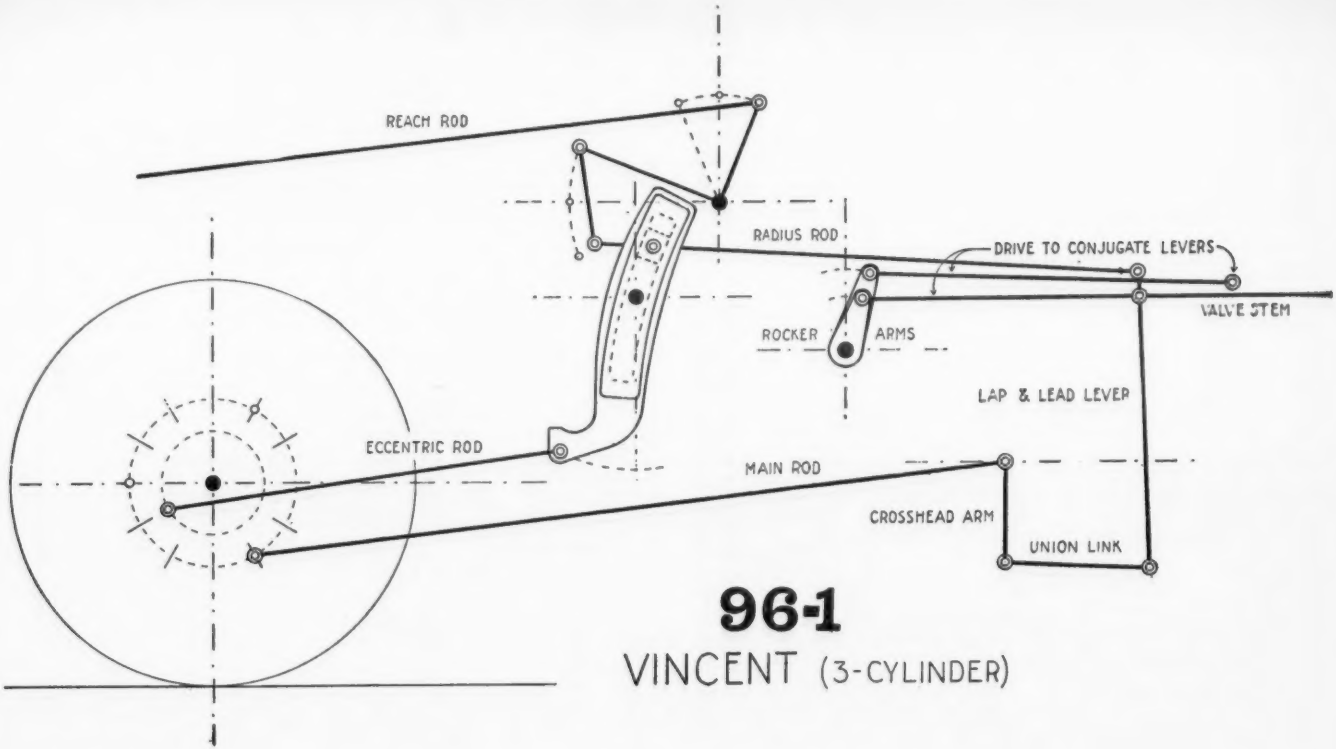
(Dwg. 96)

This conjugate motion, worked out by Vincent, of the American Locomotive Co., came into being some years before Gresley's or that of the German State Rys. were in use.

While the principle involved is identical with that of the other two, Vincent's arrangement, with its system of levers, rockers and rods, is more complicated than the Gresley motion, and it is doubtful whether it was preferable to an independent valve motion for the inside cylinder. There has been much difference of opinion on this point, and many European motive-power men seem to prefer an independently driven inside Walschaerts motion, with the link driven by an outside eccentric crank through a rocker shaft.

The illustration shown represents the right side of a divided drive, as it might be applied to locomotives of four-, six-, or eight-coupled types, with the outside cylinders driving on the second axle, and the inside cylinder in the same plane but farther ahead, and driving on the forward axle.

In this example the eccentric pin leads the main pin instead of following it. This entails using the block in the top half of the link while in the go-ahead position. Usual practice is to have the link-block in the lower half when running ahead.

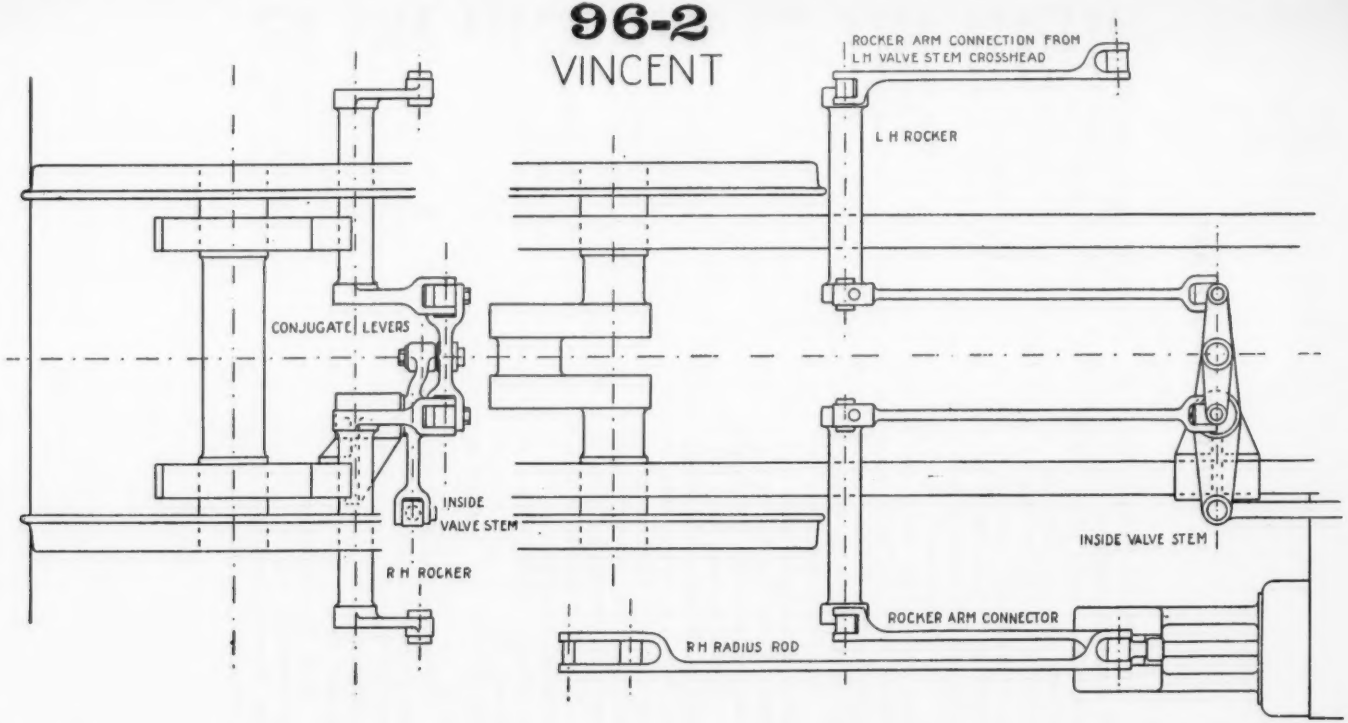


96-1

VINCENT (3-CYLINDER)

The second drawing shows the placing of the rocker arm and the conjugate levers which give the inside piston valve its drive.

96-2
VINCENT


ROCKER ARM CONNECTION FROM
L.H VALVE STEM CROSSHEAD
L H ROCKER
CONJUGATE LEVERS
INSIDE
VALVE STEM
R H ROCKER
INSIDE VALVE STEM
ROCKER ARM CONNECTOR
R H RADIUS ROD

CHURCHWARD-STEVART.

(Dwg. 86)

In 1906, the Great Western Ry. (England) built a 4-cylinder simple Atlantic passenger engine, designed by Mr. J. G. Churchward, who became the road's Chief Mechanical Engineer in 1902. In at least two respects this machine was out of the ordinary. A non-compound, it carried a high boiler pressure for its day, 225 lbs., and it was fitted with an unusual valve gear. This motion was an adaptation of the one invented by Stevart, the Belgian Engineer, in 1871, which, in turn, was a variety of Walschaerts gear minus eccentrics.

In Churchward's arrangement the motion is between the inside main rods, which drive the forward cranked axle. As in the Stevart motion, each link is driven from the cross-head on the opposite side, but this design differs from Stevart's in that they have a common center line, thus permitting the use of radius rods of equal length.

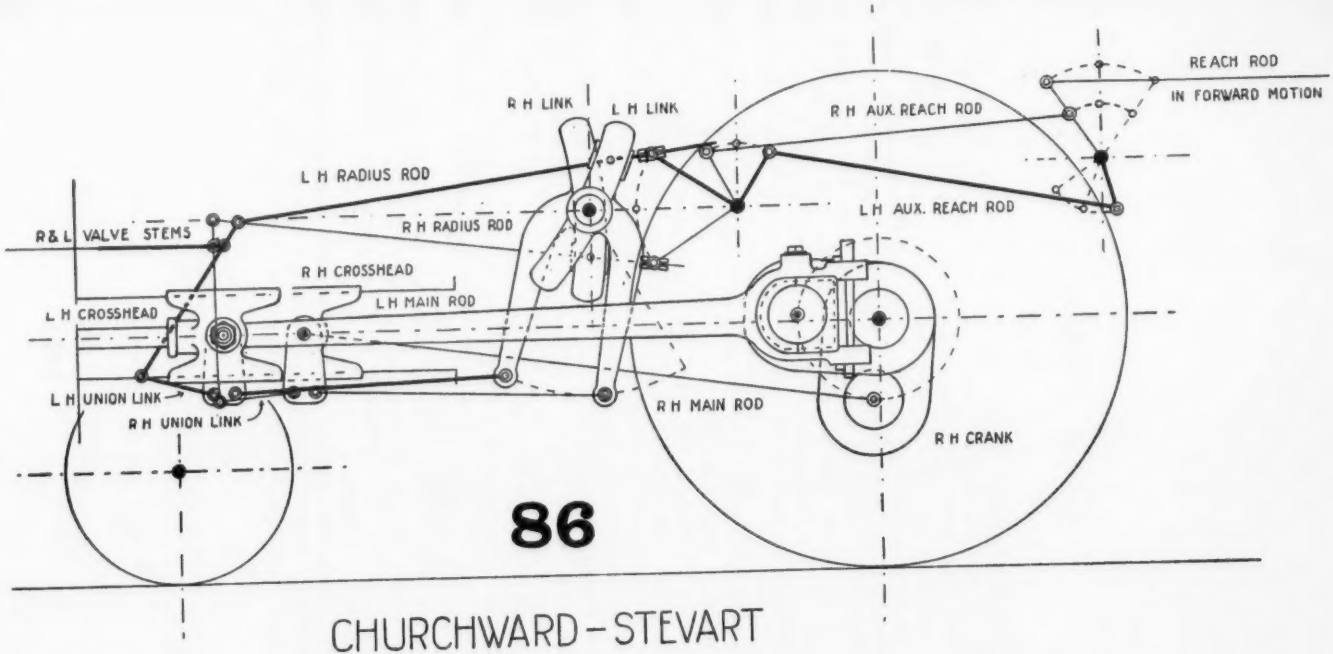
The paths of the two link arms cross each other, but these arms are curved and separated so that they do not interfere. The very slight difference in the lengths of the union links causes no noticeable deviation from normal steam distribution.

It will be seen that the reversing arrangement, with its two auxiliary reach rods, is somewhat similar to that of the Young gear later invented in America; also that, as in all the gears of this type, one radius rod and its block are at the top of the link, while the other is at the bottom. As the reverse lever is "hooked up" the two link blocks approach the centers of their respective links.

The drawing shows this motion as applied to a 2-cylinder, inside-connected 4-4-0 engine. The heavy lines show the various members on the left side, the light lines those on the right. Links and link arms are between the two main rods and are quite close together, while the union links and lap and lead levers work from the inner sides of the cross-heads.

This motion is apparently much simpler than the Young, and must have proven at least fairly satisfactory, for it remained on the engine for which it was designed until after the latter was converted to a 4-6-0. In 1929, when the engine went through the shop for rebuilding it was removed. It was not used on any other G. W. Ry. locomotives.

Note. Mr. Churchward, who designed and built the first Pacific type locomotive to run on a British line, was accidentally killed by a Great Western passenger train in a fog, and within a short distance of his own home, on December 19th, 1933.


REACH ROD
IN FORWARD MOTION
R H LINK
L H LINK
R H AUX. REACH ROD
L H RADIUS ROD
L H AUX. REACH ROD
R H RADIUS ROD
R & L VALVE STEMS
R H CROSSHEAD
L H MAIN ROD
L H CROSSHEAD
L H UNION LINK
R H UNION LINK
R H MAIN ROD
R H CRANK
86
CHURCHWARD – STEVART

YOUNG.

(Dwg. 87)

Like the Belpaire, Deeley, and Churchward gears, this one is based on the Stevart principle. In the Young gear however, the drive is taken from the cross-head only. The link on the right side takes care of the valve travel on the left side, and the lap and lead movement on its own side. It was invented by O. W. Young of Chicago who, about 1900, had worked out a two-valve Corliss gear for locomotives.

This gear, receiving its motion only from the cross-head, is not liable to any errors due to the rotation of the crank-pin, or the vertical movement of the driving axle because of spring action. It does have the disadvantage common to any of the above gears in that the engine is rendered useless in case of a broken main rod on one side.

It is rather difficult to show in one diagram how part of the motion is transferred from one side of the engine to the other; so we will use heavy lines for that on the right, and light ones for the left. The two reverse shafts (for right and left lift arms) are concentrically mounted, as are the shafts of the suspension links for the lap and lead levers. Both these and the main links have fixed fulcrums.

By tracing the motion from the cross-head on the right side through the long link-foot and link, it will be seen that the radius rod drives the left-hand valve, while the rod from the top of the link takes care of the lap and lead movement on the right side.

The main reach-rod is connected to two short auxiliary rods, concentrically (sleeve) mounted, so that when one link block is in the upper half of the link the other is in the lower.

An advantage claimed for the Young as against the Walschaerts motion is that, due to the long valve travel possible without excessive angularity of the link, a better starting, more powerful, and faster running engine is had.

The Young gear appears not to have made any particular headway, though quite a large installation was made by the Union Pacific on an early class of Mountain-type passenger locomotives, and 2-10-2's.

LAP & LEAD LEVERS
VALVE STEMS
SUSPENSION LINKS
R RADIUS ROD
L RADIUS ROD
LINKS
REVERSE SHAFT
L MAIN ROD
R MAIN ROD
REACH ROD
87
YOUNG

DEELEY.

(Dwg. 88)

This motion, another early variant of the Walschaerts gear, was invented by R. M. Deeley in the late eighties, but was never put to practical use until 1907, about three years after Deeley succeeded S. M. Johnson as motive-power chief of the Midland Railway (England). It was first applied to a 4-4-0 locomotive of Mr. Deeley's design. This, a fine machine for heavy passenger service, had 78½″ drivers and 19″ x 26″ inside cylinders with inside-admission piston valves. It proved successful enough to warrant the construction of a class of ten.

As the diagram will show, the Deeley motion has much in common with the earlier Belgian Stevart and the later American Young gears, for in all three the expansion link is driven from the cross-head on the opposite side of the engine.

In Deeley's engines the cylinders are between the frames, the right main pin leading the left. In order to show more clearly the several parts and their functions, the heavy lines indicate the motion on the left side, and the light lines that on the right.

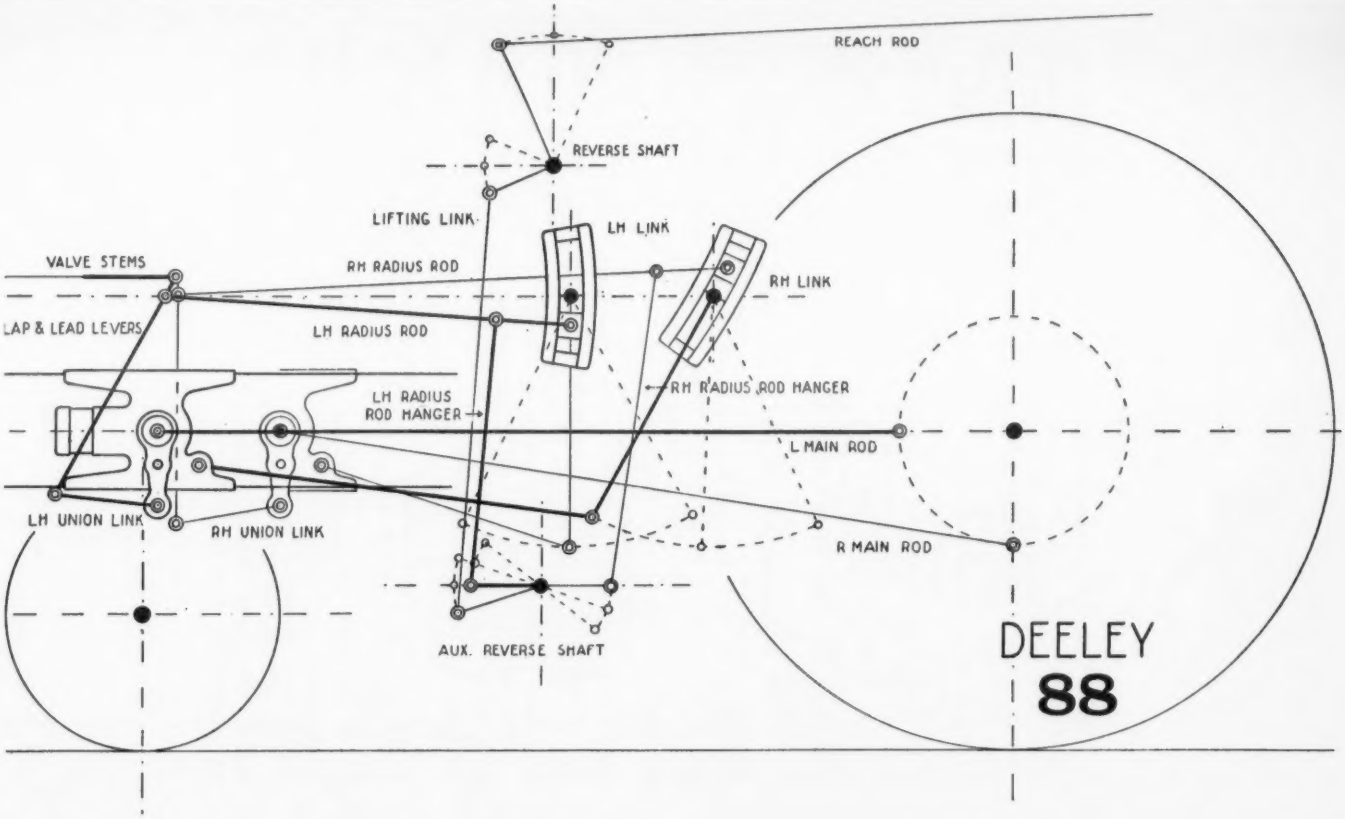
As will be seen, the lap and lead movement is obtained as usual with Walschaerts gear, but the expansion link drive, instead of being from a return crank or eccentric, is taken from the cross-head of the other side. The reach rod and short reverse shaft, at the right side of the engine, connect with a long auxiliary shaft having bearings in the main plate frames, and below the other moving parts.

Radius rod hangers extend upwards from the two arms on the reverse shaft.

The links, the left of which is placed ahead of the right, are each at the end of a short shaft, at the other end of which a lever extends down to a connection with the rod driven from the inner side of its respective cross-head.

The difference in the lengths and consequent angularity of the link drive rods, and also of the radius rods, produces a very slight variation in the distribution of steam in the two cylinders, but this is so small as to be negligible.

As with the Stevart and Young gears, an accident to either side would mean tying up the train and waiting for an engine to tow it in.


REACH ROD
REVERSE SHAFT
LIFTING LINK
LH LINK
RH LINK
VALVE STEMS
RH RADIUS ROD
LAP & LEAD LEVERS
LH RADIUS ROD
RH RADIUS ROD HANGER
LH RADIUS ROD HANGER
L MAIN ROD
LH UNION LINK
RH UNION LINK
R MAIN ROD
AUX. REVERSE SHAFT
DEELEY
88

BELPAIRE.

(Dwg. 89)

While Belpaire's name is widely known for the type of firebox and boiler he invented, and which is so widely used today, he also brought out a form of valve motion that was used on a considerable number of tramway locomotives. These powered the numerous light narrow gauge lines that were laid along the country roads, and through the main streets of small towns and villages, in Belgium, Holland and France.

These little engines came out in the early eighties and were mostly of the 0-4-0 type, housed in, and with cylinders set at a steep angle over the forward axle (the illustration shows them as horizontal).

The Belpaire valve gear is a modification of Stevart's gear, in which the motion of the links and lap lead levers is derived from the cross-heads only. Somewhat similar to the American of Young, it is not so complicated.

It will be noticed that the right hand crank is 90 degrees in advance of the left, so that when the right hand link block is above the fulcrum of the link, the left hand one must be below. In Young's gear this is accomplished by using concentric reversing shafts (one working within the other). Belpaire attained this end by the use of two reversing shafts connected by a short reach rod.

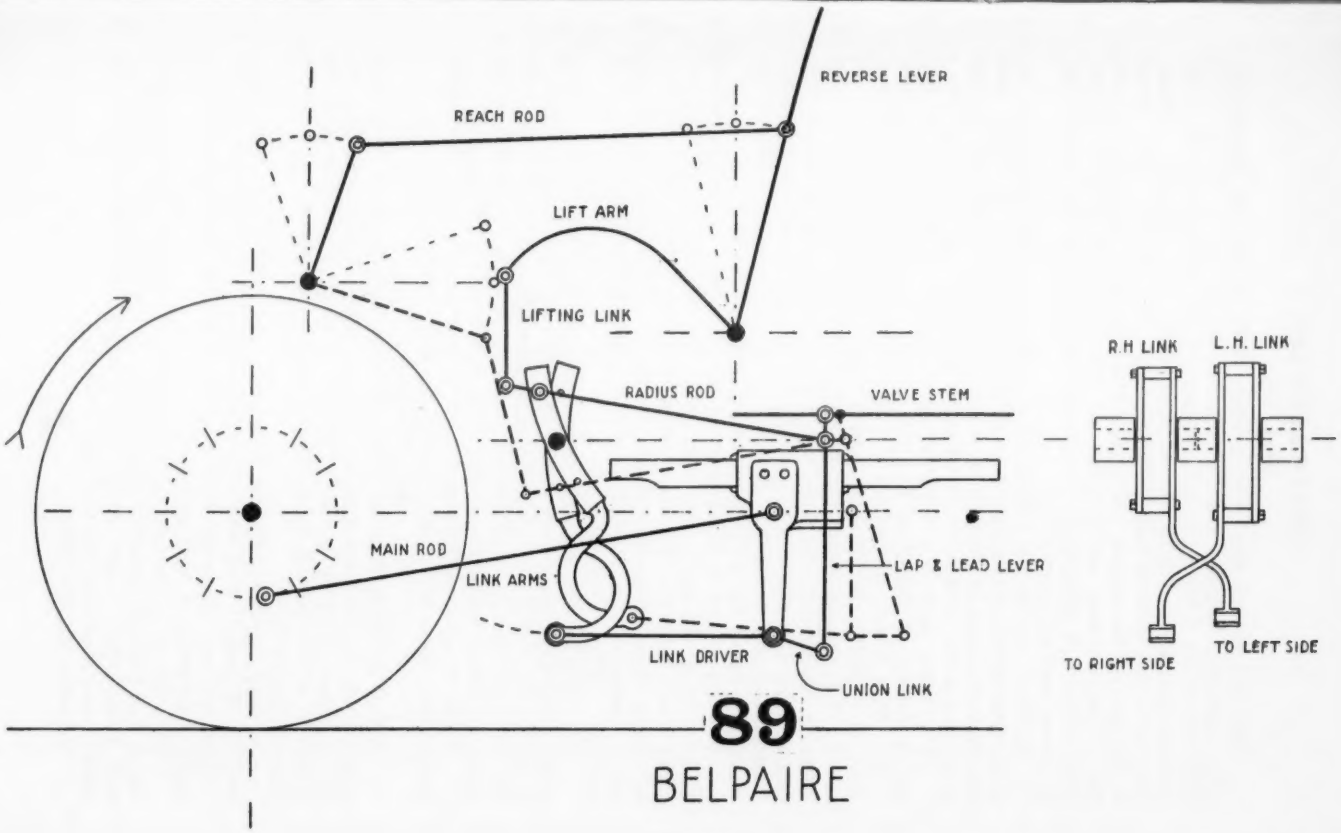
In Belpaire's motion, though the left hand link is driven by the right hand cross-head, and vice versa, the method used is different. The cylinders being inside, the links can be brought very close together, and the link arms are bent to cross each other's paths, and connect with their respective cross-heads by means of the link drivers.

The solid lines show the right hand motion, and the heavy dotted lines the left; while the sketch at the right shows the method used to get from the cross-head on one side over to the link on the other.

It is obvious that a design of this kind would hardly be practical in large units as the stresses are in anything but straight lines; however, in the work for which it was intended this gear proved eminently satisfactory.

The Belpaire motion suffers the same inherent disadvantage as the Young, and others of similar type, in that, if one side is disabled the engine has to be towed in.

In 1871 M. Stevart, of Belgium, used a gear very similar to this one on some heavy freight locomotives, and in later years the principle was adopted by other designers.


REVERSE LEVER
REACH ROD
LIFT ARM
LIFTING LINK
RADIUS ROD
VALVE STEM
MAIN ROD
LINK ARMS
LAP & LEAD LEVER
LINK DRIVER
UNION LINK
R.H LINK
L.H. LINK
TO RIGHT SIDE
TO LEFT SIDE

89

BELPAIRE

BELPAIRE-STEVART.

(Dwg. 90)

This odd arrangement was a brain child of the two famous Belgian engineers, Belpaire and Stevart. The locomotive on which it was used was of the 0-6-0 type, and was part of the railway exhibit at the Vienna Exhibition of 1873. It was anything but conventional in design. The drive was through independent rockers (one on each side) placed at the rear of the engine, the outside cylinders being mounted on auxiliary frames above and between the rear and intermediate drivers. Connecting rods coupled the upper and lower ends of the rocker with the cross-head and rear driver.

To make up for the additional weight at the rear end of the engine, considerable overhang was necessary at the front end. There were no counterbalances on the drivers as reciprocating and revolving weights were, to a great extent, counterbalanced by the action of the rockers.

The valve gear is a development of Walschaerts', based on Stevart's method of operating the link on one side from the cross-head on the other. Later applications of this principle were made by Churchward and Deeley, in England, and Young, in America.

In the example shown the reverse shaft was hung over the usual Belpaire firebox, and the long union links, instead of receiving their motion from the cross-heads, were driven from a point about midway between the center and top of the rockers. The shorter stroke of this union link called for a rather short lap and lead lever.

The left rocker, and that part of the link drive connected to it to give motion to the right hand link, are shown in dotted lines, the lower right hand connecting rod being cut away to show the action. Outside-admission slide valves were used, the valve seats having considerable slope relative to the center-line of the cylinders. It is shown in back motion.

We leave to the reader's imagination the picture of this engine when really opened up on a stretch of main line, with her 17¾″x25⅝″ cylinders and 66¾″ drivers, and this conglomeration of machinery moving along at high speed. This one, however, in spite of frequent shoppings, remained in service on the Belgian State Rys. till after 1890.

Aside from a sizable number of tramway and small industrial locomotives, very few of the rocker type were built.

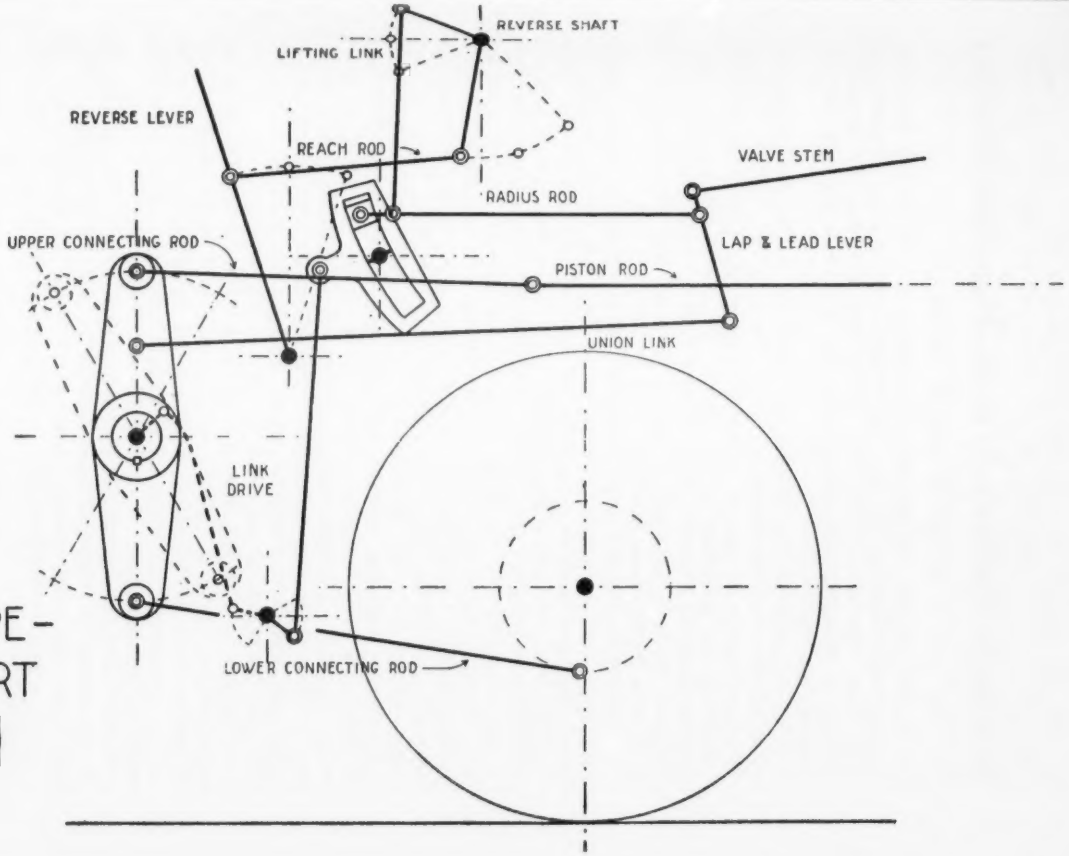
Alfred Belpaire

Alfred Belpaire, born in 1820, was a brilliant engineer who, when only twenty years of age, was appointed, by the Belgian State Ry. Administration, engineer in charge of the Arsenal, at Malines. He was president of the Second International Railway Congress, which met in Moscow, in 1892.

In 1860, he invented the type of firebox which bears his name, and which proved very successful in handling the low grade Belgian coal, which had previously been considered useless for locomotive purposes. This firebox is still popular.

Belpaire was responsible for a number of other inventions, among which was the self-propelled steam coach. This he brought out in 1878 and, though few if any are to be seen today, many were in use, the world over, about the turn of the century.

Belpaire died in 1893.



BELPAIRE-
STEVART
90

Southern Railway System - Memphis Division

By Gordon W. Lindsay

Cotton Capital of the World, Memphis is also a very important gateway city in the web of southeastern and southwestern carriers which meet here. No visitor to the city should fail to realize the importance of rails to Memphis, running as they do like veins through the vital parts of the city.

To the Southern, N. C. & St. L., and the Louisville & Nashville, Memphis is a western terminus; to the Rock Island, Cotton Belt and Missouri Pacific, an eastern terminus; and to the Illinois Central and the Frisco, an important on-line point. To the Union Railway (MP) and the Memphis & State Line (IC-I&N), both terminal lines, it is home. For the Yazoo & Mississippi Valley, operated and controlled by the I. C., it is the northern terminal.

Known also to Memphis is the Gulf, Mobile & Ohio, which, though owning no track or other facilities in the city, has trackage rights for the operation of freight trains over the line of the Southern Ry., from Corinth, Miss., to Forrest Yard, at Memphis. All terminal switching and placement in Memphis of G. M. & O. traffic is done by engines and crews of the Southern. A. G. M. & O. freight agent and clerical force are maintained on the second floor of the Southern's Lauderdale Avenue freight station. No passenger service is permitted under the trackage agreement which was originally granted to the Mobile & Ohio. At that time, the M. & O. was controlled by the Southern, but was operated separately. When the M. & O. was purchased by the G. M. & O., and merged with it to form the present G. M. & O., the trackage rights were retained. A similar situation exists at Birmingham, Ala., where the G. M. & O. uses the Southern's tracks from Birmingham to Haleyville, Ala., and at New Orleans, where trackage rights to the G. M. & O. are over the Southern from New Orleans to Slidell, La.

Despite its importance as a river port, Memphis citizens were not unmindful as early as 1831 when, on December 17th, a group received a charter for the Atlantic & Mississippi R. R. Apparently the vision and enthusiasm of the group exceeded their resources, as no construction was ever accomplished.

The Memphis Division of the Southern Railway System, while by no means first in volume of traffic handled in and out of Memphis today, can rightfully claim several important "firsts" in Memphis railroad history, which we feel entitles it to first place in the history of Memphis rail lines.

It was the first rail line in Memphis through its predecessor the La Grange & Memphis R. R.; it operated the first sleeping car service out of Memphis, July 1, 1859; and the first RPO car, March 19, 1868, both of these on the Memphis & Charleston R. R. Then, on November 22, 1872, the first air-brake-equipped train was operated on the M. & C.

To properly start the history of the Memphis Division we must

move eastward from the city some 150 miles to Tuscumbia, Ala. In this small village, on the banks of the Tennessee River in Northern Alabama, was begun the first segment of the present Southern Railway Memphis Division. On January 15, 1830, the Tuscumbia R. R. was incorporated to build two miles of line from the river landing, southward to the town. This was no simple, flat stretch of line, but a considerable undertaking for the times, as the line climbed 400 feet in its two-mile length. The Tuscumbia R. R. was completed and opened for operation on June 12, 1832, with horses for motive power. Contemporary records state, "One or more horses were provided to pull the loads," but the description of the rolling stock is lacking. Today this line lives as a part of the Florence Branch, coming into the Southern Railway System through absorption by the Memphis & Charleston, of which more later, on February 29, 1848.

Such was the enthusiasm of these early railroaders that, on January 13, 1832, the State of Alabama granted them a charter for the Tuscumbia, Courtland & Decatur R. R. To quote from the charter, it was to commence "at the east end of the Tuscumbia R. R. and extend same by way of Courtland and to Decatur in the County of Morgan." The original charter was limited to a 50-year period, but, on November 10, 1832, it was amended to grant perpetual life to the line. Construction begun, the T. C. & D. reached Leighton, Ala., 11 miles to the east, on August 30, 1833. Here it ran against one of the familiar troubles of early railroad construction. Its plans outran its finances, and time out was necessary to float some bonds. This accomplished, the line proceeded with construction, reaching Courtland, July 4, 1838, and Decatur, December 15, 1834. Horses supplied the only motive power until February, 1835, when the first locomotive to make its appearance in Alabama was placed in service. Unfortunately, no pictorial record of this tradition breaker remains, only its name, "W. W. Garth."* Though proudly named, this engine was not equal to handling unaided the tonnage offered, so horses were retained until two new engines arrived on July 1, 1836. At this time horses were dispensed with to a great extent. On February 2, 1839, the T. C. & D. was authorized to build westward to connect with the La Grange & Memphis R. R. at La Grange, Tenn. More hopes than money forced the T. C. & D. into foreclosure and sale at public auction September 22, 1847, without this construction being accomplished.

Little remains of the detailed history of this line's motive power or rolling stock, but a traveler of 1838 is quoted in a contemporary Memphis newspaper as describing the passenger equipment to be, "something like a coach body, having accommodations for twelve travelers and drawn by two horses." From this description it would appear that steam power was reserved for freight service until a fairly late date in the road's history. The right-of-way of the T. C. & D. is described as consisting of "5x5 wood stringers resting on cross ties. Atop the stringers were 3-inch iron straps to serve as running rails."

* See Editor's Note at close of article.

At the foreclosure sale the properties of the T. C. & D. were purchased by David Deshler and reorganized as the Tennessee Valley R. R. Although this road suceeded to all rights and properties of the T. C. & D., and the privilege of purchasing the Tuscumbia R. R., its finances were in such poor condition that nothing was accomplished. In fact, no new construction was attempted until 1850, when the Memphis & Charleston R. R. entered the picture.

Leaving Alabama, let us return to Memphis and see what her citizens were doing about railroads in the 1830's. We have already mentioned the Atlantic & Mississippi which did no building. December 14, 1835, saw the chartering of the La Grange & Memphis R. R., with plans to build a 40-mile line from Memphis eastward to La Grange, Tenn. Apparently the legislators of that day were not too sure that all the efforts of the early incorporators would be directed solely to railroading, for to quote from the charter, the La Grange & Memphis was "for the purpose of facilitating the intercourse and transportation between the town of LaGrange, in the county of Fayette, and the town of Memphis, in the county of Shelby, in this state, by means of a railroad, BUT FOR NO OTHER END OR PURPOSE WHATSOEVER." (caps mine). The charter also required that the L. G. & M. "shall establish one lateral branch of said railroad leading to Somerville from some eligible point at or near Moscow, Tenn." Somerville was the county seat of Fayette County, hence this requirement. Although built at a later date, the Somerville Branch is now abandoned and the tracks removed.

1837 saw six miles of the L. G. & M. finished and operating from Memphis to Buntyn, now a station on the Southern within the Memphis city limits. In 1837, an amendment to the charter granted the right to extend the Somerville branch to Jackson, Tenn., to connect with a proposed line from the Mississippi River. This extension was never built. This same year the State of Tennessee made its first investment in railroads by subscribing $125,000 to the capital stock of the infant corporation. By January, 1840, an extension to Tuscumbia, Ala., was authorized to make connection with the T. C. & D. Lack of construction progress and money necessitated the passage, in 1841 and 1844, of two amendments to the charter, extending the time limit on completion of the line to a final date of January 1, 1848. This later date proved overly optimistic as, by 1846, the little line was bankrupt and for sale.

The Memphis & Charleston R. R. was then chartered on February 2, 1846, "to commence at the Union Street Crossing of the La Grange & Memphis R. R., thence in an easterly direction to such point on the southern boundary of the State of Tennessee . . . . as a continuous railway communication . . . from the city of Memphis to the city of Charleston." The charter also gave the M. & C. the right to purchase the right-of-way, equipment and motive power and rolling stock of the L. G. & M. This proved to be, "326 tons of railroad iron, one locomotive engine and nine railroad cars," together with nine miles of railroad from Memphis to White Station, Tenn.

In order to implement plans for the extension of the M. & C. line eastward, application was made to the legislatures of Alabama and Mississippi for authority to build through their respective states to Tuscumbia, Ala. Alabama's legislators promptly granted, on January 7th, 1850, the requested rights but Mississippi refused unless the proposed route was so altered by a southward dip as to pass through the town of Holly Springs, Miss., enroute to Tuscumbia. To do this would have greatly increased construction costs and lengthened the line some 15 miles. When, in 1850, Mississippi included this requirement in the charter granted, the M. & C. declined; and countered with a new grant secured from the Tennessee legislature to build the line entirely within Tennessee and bypass Mississippi completely.

There the controversy stood, until March 1, 1851, when Mississippi finally yielded and granted the M. & C. a charter that was acceptable. With the absorption of the Tuscumbia R. R. (1848) and the T. C. & D. (1850), a through line of 194 miles was in operation from Memphis to Decatur by the latter part of 1854. Connection with the Nashville & Chattanooga (now part of the N. C. & St. L.) was accomplished after new construction of March 28, 1857.

Thus was opened a through rail route from Memphis to Charleston, S. C., via the M. & C. to Stevenson; N. & C. to Chattanooga; W. & A. to Atlanta; Ga. R. R. to Augusta; and S. C. R. R. to Charleston. Today this route is via Southern to Chattanooga, with trackage rights over the N. C. & St. L., from Stevenson; the N. & C. and W. & A. are part of the N. C. & St. L.; the Georgia R. R. retains its identity between Atlanta and Augusta; and the S. C. is now a part of the Southern.

This great day in the history of the two cities was fittingly described by a writer of that period in these words, "When the road was completed nearly 25,000 people visited Memphis upon the invitation of the railroad company to celebrate the successful completion of so important a work, and also to witness the 'marriage', as it was called, of the waters of the Atlantic Ocean and the Mississippi River. This ceremony consisted in pouring a hogshead of Atlantic water into the Mississippi amidst the booming of cannon and the shouting of the people." This ceremony was duplicated on July 9, 1929, when an exact replica of "The Best Friend of Charleston," first locomotive of the South Carolina R. R., together with its three cars, arrived in Memphis under its own power. This equipment was built by Southern Railway shopmen in the company's Spenser and Hayne shops, from old plans and drawings in the archives of the system. Each step in the construction of this pioneer among Memphis railroads, and other lines of that era, was front page news which the papers handled with flowing prose as the following excerpt from *The Commercial Appeal* will indicate:

"Memphis, Tennessee, February 18th, 1857.

For several weeks past the hotels and boarding houses of Memphis have been literally crowded with persons from the adjoining counties and neighboring states, giving a foretaste of what will

be when our railroad connections are made. The Memphis and Charleston R. R., when completed (say in about 90 days), will pour upon us another flood of travel. Property owners must prepare to welcome these strangers with fine or comfortable homes, should it suit their tastes or interest to pitch their tents among us."

When first through service was provided by the Memphis & Charleston trains between Memphis and Chattanooga, the Nashville & Chattanooga supplied both the motive power and the crews to handle the trains over the N. & C. tracks from Stevenson, Ala., to Chattanooga. This service was covered by a thirty-year agreement, dating from June 23, 1858. In return for this service, the Memphis & Charleston turned over to the N. & C. its grants of state aid in Tennessee and Alabama. In 1880, this agreement was amended to grant full trackage rights to the Memphis & Charleston trains and the same trackage rights are still in force today over the same route.

The War Between the States brought its share of destruction and seizure to the M. & C. from which it took many years to recover. At that time (1861) the road had two operating divisions; the Eastern, from Stevenson, Alabama, to Bear Creek, Alabama, and the Western, from Bear Creek to Memphis, Tennessee.

The Eastern division was seized by Federal forces on April 11, 1862, and operated by them until the close of the war. The Western division was operated by the M. & C. officials under supervision of the Confederate Government until July 6, 1862, when it was taken over by the Federal troops, after the capture of the city of Memphis. Fortunately, three days before the seizure, the greater portion of the motive power and rolling stock was moved southward within the Confederate lines in Mississippi and did yeoman service on other lines of the Confederacy. During the war years the line suffered the depredations of both Union and Confederate raids many times. As a reminder of those war years, the present Southern Railway System yards in Memphis are named for the great cavalry general of the Confederacy, Nathan Bedford Forrest.

At the close of the War Between the States the Memphis & Charleston, in common with most railroads in the Confederacy, was in bad shape. Right-of-way and buildings were destroyed in many places; in extremely poor repair elsewhere; rolling stock and motive power worn out and scattered; finances practically nil. But, withal, the need for railroads to help the prostrate South to her feet was most imperative and little time was lost bemoaning the misfortunes of war.

The most necessary primary step was to procure working capital and to raise these funds a second mortgage of $1,000,000 was executed on January 1, 1867, and secured by the bonds of the railroad. With funds in hand, rehabilitation began and progress was rapid. As soon as the line was running regularly to Chattanooga, plans were laid looking to extension of the line toward Cincinnati, gateway of many tons of freight destined to rebuild the South. The building of the Cincinnati Southern (now the C. N. O. & T. P. Southern Railway

System) was underway, and at this time, 1868, it appeared that it would use a route to Chattanooga considerably west of the location of the line today. The M. & C. planned a connection with the C. S., at Sparta, Tenn. To accomplish this connection the M. & C. purchased, in 1871, the Winchester & Alabama R. R. and the McMinnville & Manchester R. R., and took over their operation on October 2, 1871.

Briefly, the pertinent facts in the history of these two lines are worthy of note at this point. The Winchester & Alabama had been chartered in Tennessee, in 1850, for the building of a line from Winchester, Tenn., southwest to Huntsville, Ala. Later additions to its charter provided for an extension from Winchester northeast to Decherd, Tenn., for connection with the Nashville & Chattanooga (1851) and to Fayetteville, Tenn. (1852). A line of railroad was actually completed from Decherd to Fayetteville, via Winchester and Elora, in 1859. As was so often the case with these pioneer ventures, the Winchester & Alabama was unable to meet its payments on the debt this construction had created and was sold under foreclosure by the State of Tennessee who had advanced the funds. The M. & C. purchased the line at this foreclosure sale, on September 2, 1871.

The McMinnville & Manchester had secured its charter in Tennessee (1849) empowering it to build from McMinnville through Manchester to a connection with the Nashville & Chattanooga, at Tullahoma, Tenn., the same Tullahoma that became well known in World War II as the site of Camp Forrest. A later addition to the charter provided for an extension to Sparta, Tenn. By 1856, thirty-four miles of line were finished from McMinnville to Tullahoma and operation was in force. Again the moneys advanced by the State of Tennessee were unpaid and foreclosure and sale to the M. & C. in 1871, were the result. From this it can be seen that prior to the War Between the States, Tennessee was active in state aid to new railroads, and had the war not imposed an impossible burden on the many small lines aided, the investment would probably have proved a good one.

The Memphis & Charleston began operation of these two disconnected segments as previously noted, on October 2, 1871, and immediately planned construction from Huntsville, Ala., to Fayetteville, Tenn., to connect with the Winchester & Alabama. This construction was later completed via Elora instead of Fayetteville. In addition, a start was made on grading the extension of the McMinnville & Manchester northward to Sparta, along the line of the abandoned Southwestern.

The Southwestern had been chartered in Tennessee, in 1851, for the purpose of extending the McMinnville & Manchester to Danville, Ky. Money was obtained from the State of Tennessee and some surveys and grading done, but, due to the interruption of the war, no railroad was built and the incomplete line was foreclosed and abandoned in 1871.

Plans for the Cincinnati extension of the Memphis & Charleston lines were abruptly halted in 1872, when the Southern Railway Security Co., on March 5th, acquired control of the Memphis & Charleston under a 99-year lease. With the halting of these plans, the value

of the recently acquired short lines dropped and they were leased to private operators, in 1874, for a period of six years, but lack of success in operation forced their return to the M. & C. in 1877. Having no use for these lines in their expansion plans, the M. & C. sold them both to the Nashville & Chattanooga R. R. on July 28, 1877. The Nashville & Chattanooga completed the McMinnville & Manchester to Sparta, Tenn., and the Winchester & Alabama to Huntsville, Ala., and they are both operated at the present time as part of the N. C. & St. L.

The control of the Southern Railway Security Co. was of short duration, as their 99-year lease of the M. & C. was terminated by mutual consent, April 30, 1874, and the M. & C. again took over active control and operation of its properties. During the next two years the road considerably enlarged its terminal facilities at Memphis by building the Washington Street Branch. At this time, 1875, its roundhouse, freight yards and freight passenger station were located along Lauderdale Avenue between Madison and Adams Streets. The Washington Street Branch was run from the east side of this terminal, north on High Street to Washington, thence west on Washington to the Mississippi River bank. This gave access to river traffic and a considerable business was handled in connection with the river steam boats. The City of Memphis granted permission for the operation of steam engines through the city streets on this branch until 1893. When this permission was withdrawn, horse power was tried and found unsatisfactory and the branch abandoned. A small portion of the rail is still visible on Washington, between Main and Front, where the overpaving has worn away. No record remains to indicate whether electrification of this line was ever considered.

By 1877 the familiar trouble of expenses exceeding income was facing the road and help was sorely needed. General refunding of the Line's outstanding debt was imperative, and, to improve its credit standing, the M. & C., on June 2, 1877, was leased to the East Tennessee, Virginia & Georgia R. R. for a period of 20 years. The yellow fever epidemic in Memphis during 1878 and 1879 further hurt the finances of the M. & C., as it brought all business to a virtual standstill.

Under the control of the E. T. V. & G., the trackage rights over the Nashville & Chattanooga between Stevenson, Ala., and Chattanooga, Tenn., were secured in October of 1880. Stormy financial seas were still ahead of the M. & C., as its parent company, the E. T. V. & G., underwent a reorganization and became the E. T. V. & G. Railway, in 1886. This new corporate entity succeeded to the M. & C. lease, and a new plan for the extension of this road westward from Memphis to Kansas City was unfolded. This proposed western extension secured a charter under the name of the Memphis, Arkansas & Kansas Ry. Another plan at the same time called for the building of a line from Stevenson, Ala., to Chattanooga, that would do away with the necessity of the existing trackage rights. This line was chartered as the East Tennessee & Alabama Ry., and authorized to construct the above

mentioned trackage and also a bridge over the Tennessee River, at Chattanooga.

Litigation instituted by minority stockholders objecting to the E. T. V. & G. reorganization left both these projects as "paper railroads" and no construction of any import was accomplished. A few piers were built in the Tennessee River, near Lookout Mountain, for the proposed bridge, and remained standing until about 1942, when they were dismantled. A further result of the stockholders' suit was to annul the lease of the M. & C. to the E. T. V. & G. and return the control and operation of the line to the M. & C. officials. Ownership of a majority of the capital stock still remained with the E. T. V. & G. and that line's bankruptcy in 1892 forced the M. & C. into another receivership.

Various legal technicalities of receivership and reorganization kept the road in hot water for the next several years, but finally it was sold to the Southern Railway Co., which had been formed in 1893, and was also owner of the E. T. V. & G., and on February 26, 1898, it became the Memphis Division of the Southern. An interesting sidelight on this transition is the fact that the M. & C. line in Mississippi was sold separately from the rest of the road in order to comply with a Mississippi law which forbade the operation of lines within that state by foreign corporations. To comply, a separate company, M. & C. Ry. of Mississippi, agreed to, "properly and economically maintain and operate its railroad within the State of Mississippi," and will allow the Southern Railway Co. to "run and operate its locomotives, cars and trains thereover in the transportation of the U. S. Mails and the maintenance and conduct of interstate commerce." It was further agreed that the Southern Ry. would allow the M. &. C. Ry. of Mississippi the use of its (SOU) rolling stock and motive power upon payment of proper rental, tax, insurance and maintenance charges, and that the parties will respectively operate their lines in harmony and exchange traffic freely. For many years thereafter that portion of the Memphis Division in the State of Mississippi was shown in a contrasting color on Southern Railway System maps, to indicate the separate corporate existence.

Now that the Southern had acquired the M. & C. properties, the plan for replacing trackage rights from Stevenson, Ala., to Chattanooga with a line of its own came alive again. This time a new company was chartered under the name of the Memphis-Chattanooga Ry. to accomplish the bridging of the Tennessee River and the line construction. Again a stockholders' suit attacking the M. & C. reorganization, prior to its sale to the Southern, caused suspension of the plans and construction. This in 1899.

Thus, after nearly 70 years of toil, hope and struggle the Memphis Division was born and has become a strong arm of a great railroad system. Today with its 130 lb. rail and rock ballast, automatic block signalling and automatic train control, it follows practically the same path as did the M. & C., when it first linked Memphis with Chattanooga

to make a through route to the sea, at Charleston, S. C. Other mergers, purchases and absorptions now make it Southern all the way, where several lines were necessary in years past. As is true of so much of railroads, those who built, built well, for into their work went not only money, labor, stone and steel, but dreams and hopes and the hearts of many men. The Moscow-Somerville branch is gone, and with it the famous local known as the "Paper Boy," which carried the *Commercial Appeal* to stations down the line, and bore on the pilot of its engine a figure of a newsboy holding aloft a paper. What ever became of this figure and how long it remained on the engine we do not know, but it was there on the first run we are sure. It was in the spring of 1932 that yard clerks in Forrest Yard at Memphis seeing some carloads of old rail remarked, "There goes the Somerville Branch." Not much of an epitaph but fitting!

A new branch has been built from Emco-Listerhill Jct. to Emco, to serve the industries in this area; but as the gleaming diesel powered "Tennesseean" clips off the miles from Chattanooga to Memphis (323) it runs in hallowed tracks bought with sacrifice, hope and struggle; consecrated at points such as Bridgeport, Corinth, Decatur and many a way station, by the blood of Confederate and Federal alike.

The last important improvement in the Memphis Division was the construction of Forrest Yard in 1914, giving a yard and terminal facility both ample and modern for the handling of present day traffic.

Today the Memphis Division has two through passenger trains daily. Leaving Memphis Union Station at 8:30 A. M., No. 36 heads for Chattanooga, where it is due at 7:30 P. M. Headed by a green and white single-unit EMD diesel or sometimes an EMD or Baldwin "Jeep," it is typical of a "working" passenger train. Its consist is usually an R.P.O., one or two storage mail cars, a baggage combine and three coaches. This train is in every sense a local, making all stops on its way east to Chattanooga. For a rail fan there is no better way to see the whole Memphis Division by daylight.

The next Southern departure from Memphis is at 7:15 P. M., when the "Tennessean," with its 2000 H. P., 2-unit EMD diesel in green and white, pulls out with its stainless steel, reclining-seat streamliner for Washington. The stress of wartime traffic necessitated increasing the capacity of this original, reserved-seat-coach streamliner by the addition of two or three conventional coaches to handle overflow traffic. Three Pullmans, also of the conventional type, were added during the war years giving Memphis-Chattanooga, Memphis-Knoxville and Memphis-New York service. In the last year or so, equipment on the train has been upgraded somewhat. The Memphis-New York car is now a 14-roomette, 4-bedroom car. However, the Memphis-Chattanooga, Memphis-Knoxville, and Memphis-Washington cars still remain standard Pullman. There is also a Bristol, Va.-Nashville, Tenn., car, which is handled between Bristol and Chattanooga on this train, and via the N. C. & St. L. beyond Chattanooga. The inbound "Tennessean" arrives from the east at 7:45 A. M., and No. 35 arrives from Chattanooga at 4:50 P. M.

As is the case on almost all railroads, freight traffic is the mainstay of the Memphis Division. Seven miles from downtown Memphis, to the east, is Forrest Yard. Here trains are made up from connecting lines deliveries and traffic originated at Memphis. Cars from and to S. S. W. and I. C. are interchanged through the Illinois Central's Iowa Ave. yards; for the S. L. S. F., L. & N. C. & St. L. and M. P. at K. C. Jct., and for the Rock Island at their 4th Street yards. Present terminal operations at Forrest Yard, and in the city of Memphis on Southern trackage, are handled entirely by diesel switchers. Cars handled through Forrest Yard for the Southern and G. M. & O. average about 1500, loaded and empty, each twenty-four hours. Road-haul freight engines are standard two- and three-unit EMD freight diesels with "Jeeps" on local service, and occasionally used as a second or third unit of a heavy freight. The G. M. & O. trains, using Southern Railway tracks between Corinth, Miss. and Forrest Yard, are powered by G. M. & O. diesels, but operated by Southern Railway crews.

Southern's freight house is in downtown Memphis on Lauderdale between Madison and Jefferson. This building, still in use and well maintained, was built in 1848 for the Memphis & Charleston. The present south shed, which now handles inbound freight, was originally the M. & C. passenger train shed. The central portion of the building, now housing the agency forces of the Southern and G. M. & O. was originally the general office of the M. & C., with passenger waiting room, baggage room, and ticket office. Just west of this building the old wooden turntable used for M. & C. engines now lies buried under the pavement of Lauderdale St. The freight station has the usual team tracks, automobile platform and overhead crane and merchandise platforms at which 70-80 cars of in and outbound LCL freight are worked daily.

With this picture of the Southern in Memphis and its Memphis Division in your mind, some night as you relax in your berth on the eastbound "Tennessean" and take leave of Memphis, let your mind drift back to this description of what the same trip would have been just 67 years ago, in 1886. Instead of a sleek streamliner, you would enter the famous Woodruff Sleeping Car, then running from Memphis to Lynchburg, Va. Lighted by coal oil lamps hanging from an oil cloth-covered ceiling, before being made up for sleeping, it presents an appearance similar to the coaches of that day. Forty feet long and equipped with reversible seats, with an open dressing room at one end containing a marble basin and hand pump for washing facilities. Toilet facilities were at the opposite end. To make the car up for sleeping, two seats were put together, vertical poles fitted into a hole in the floor and at the upper end into roof brackets, where the clerestory began. Two poles to each section, having a bracket on each pole about five feet above the floor, supported the aisle side of the upper berth. The outside of the upper was supported by similar wall brackets. The upper berth is a lattice of laths laid on these brackets and covered

with a thin mattress. Separation of sections is by curtain. All goes well unless the pole brackets fail, dumping the passenger into the aisle, or if the tenant of the upper be quite large the wall brackets may fail and drop him or her onto the lower berth occupant. If neither misfortune occurs and all is well along the line, 19 hours later you will be in Chattanooga.

But this is 1953, and we wake from our remembering to exclaim on the smooth speedy pick-up of the diesel leaving Buntyn, last suburban stop in east Memphis, realizing that we are enjoying more comforts than we have at home and will be in Chattanooga in 8½ instead of 19 hours. All this and much more possible because men had a vision of construction and creation and believed in it and worked, and kept working day and night against time, weather, friction and inertia. Such is the story of all railroads of Memphis or any other city in our great country.

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Editor's Note:

In the Annual Report of the Tuscumbia, Cortland & Decatur R. R., dated August 1st, 1836 we find nearly two pages devoted to their "engine troubles." According to this report, their first engine was the "Fulton," built by E. Bury of Liverpool and placed in service on the road June 1, 1834. She "has been a useful engine of her class." The second engine was the "Pennsylvania," purchased from the Philadelphia, Germantown & Norristown R. R. and placed in service in February, 1835. The report states the engine has been of no service to the road, three-fourths of the weight is on the drivers making her too heavy for the track and the boiler was deficient in generating steam. At the time of the report, she was used to drive the machinery for the machine shop and the report states that it is planned to enlarge the boiler and place her on eight wheels. The third engine was the "Comet" built by the West Point Foundry and placed in service in June, 1835. The report states that this engine has been of little use to the company because of the bursting of a cylinder. When received she was of the 0-4-0 type, with no connecting rods for these wheels and the road removed the first pair of wheels and substituted a four wheeled truck. The fourth and last engine was the "Triumph" from M. W. Baldwin which was placed in service June 1, 1836 and the report states that she "performs well."

No mention is made of a locomotive named "W. W. Garth." If the locomotive that carried this name was the one that was placed in service in February, 1835, then it must have been the one purchased from the Philadelphia, Germantown & Norristown R. R. However, it could not have been the first locomotive to have entered service since the Bury engine was placed in service the year previous. There is no doubt but that the failure of this engine to perform as expected, together with the accident to the "Comet" seriously embarrassed the road and they had to resort to the use of horses to help the "Fulton." Whether the

"Pennsylvania" carried the name "W. W. Garth," and the gentleman objected to having his name placed upon such a locomotive, and he could hardly be blamed, is something we can only wonder but there must have been some foundation for the original news report. Your Editor felt that this was the proper place to mention the four engines found in the report of 1836.

Some of our members may be interested to learn that the "Bulletin" of the Australian Railway Historical Society contains a wealth of information relative to the railways of that commonwealth. A membership, costs $2.50, carries with it a subscription to the "Bulletin" and letters and fee should be mailed to Mr. Noel J. Thorpe, Hon. General Secretary, 19 The Boulevard, Sans Souci, N. S. W., Australia.

Locomotives of the Rutland Railroad and Its Subsidiary Lines and of the Adirondack & St. Lawrence and St. Lawrence & Adirondack Railroads

By F. Stewart Graham

ACKNOWLEDGEMENTS

In preparing this record of Rutland locomotives, a task made difficult by the absence of authentic records, the author has made generous use of material presented in the Central Vermont Bulletin, published by the R. & L. H. Society in 1942. It has not been his intention to merely re-arrange that material, but to make additions and corrections made possible in the light of more recent investigation and information.

Effort has been made to have the rosters "tie-in" together so that, without too much difficulty, the complete history of any engine, so far as is known, may be traced from beginning to end, without needless duplication of data.

Since it appears that one of the main uses to which locomotive rosters are put is the identification of photographs, it is important that, to use these rosters for such purpose, one must know the approximate date on which the photo was taken, since five number series are involved in Rutland history.

Preparation of this record has been made possible by use of the above-mentioned bulletin and the unlimited patience and help of your Editor and President, Mr. Charles E. Fisher. The author is also greatly indebted to officials of the Rutland Railway Corporation and to Messrs. Thomas B. Annin, of Red Bank, N. J., Paul T. Warner, of Easton, Pa., Fred H. Welling, of North Bennington, Vt., and Prof. S. R. Wood, of Stillwater, Okla., for their help in gathering and confirming much of the material used. To the many others, who have contributed to the records of Rutland locomotives through their independent research, and who have made their data available, sincere acknowledgement is hereby made.

F. Stewart Graham.

Bennington, Vt.
January 1st, 1954.

LOCOMOTIVES OF THE RUTLAND COMPANIES

Rutland & Burlington R. R.	1843-1867
Rutland Railroad	1867-1951
Rutland Railway Company	1951

The history of the locomotives of the Rutland Railroad is quite as complicated as that of the road itself. The financial affairs and many changes in management, ownership and operation, as well as its leases

of smaller lines and its own leasing to the Central Vermont, are all matters of record and have been fully described by various writers.

The records of the locomotives, however, which came under control of the Rutland System and should be accounted for in any history of that company's motive power, have not been so carefully preserved and, as a result of the frequent changes in corporate set-up, present a problem that is both interesting and difficult.

To systematically record and account for the locomotives that at one time or another were the property of the Rutland it seems advisable to consider them by groups, following the chronological management "eras" of the road's career in somewhat of the following order:—

1. The locomotives from the road's beginning, in 1843, to the time it was leased to the Central Vermont, December 30th, 1870, including engines of the roads under lease to the Rutland, such as the Vermont Valley, Montreal & Plattsburg, and others, if any. Roster I accounts for these and the Rutland's locomotives under the C. V. lease, which existed from 1870 to May, 1896. Of the engines turned over to the C. V. under this rental agreement, a number were scrapped and some new ones added to the Rutland's roster. The Rutland engines were eventually renumbered into the C. V. 200 series, but, perhaps, not until about 1886. This date is indicated by the fact that locomotives built in that year by Baldwin, for the O. & L. C., were numbered in the 300's. This series had been assigned to O. & L. C. engines, that road having been leased by the C. V. at about the same time as was the Rutland. The Rutland engines were re-lettered, with "C. V. R. R." painted on the tenders, and, in smaller letters, the words "Rutland Division."

During each of the foregoing periods there was a great deal of re-naming, re-numbering, and re-assignment of locomotives and here again is much conflicting information concerning these changes.

2. Another group, which is really the beginning of the current series, is composed in part of the locomotives returned to the Rutland, upon cancellation of the C. V. lease, in May, 1896, and which retained their 200 series numbers until 1901. To these must be added engines acquired by purchase and by absorption of the O. & L. C., in 1899, the Bennington & Rutland Ry., in 1900, and the Chatham & Lebanon Valley, in 1901.

3. The locomotives of the 1901 series, including many of the foregoing, to which were added a number of new ones. Of this group, 77 were renumbered into the N. Y. C. series, in 1905, when that road "took over" the Rutland. Some incidental renumbering took place in this series.

4. The present and final number series of the Rutland was adopted in 1913, when the N. Y. C. released the Rutland locomotives from their

numbering system, and they were changed into a new series, Nos. 10 to 155, except thirteen shown elsewhere, which retained the N. Y. C. numbers.

During the years 1865 to 1871, the Rutland leased a number of small roads, viz., the Addison R. R., Montreal & Plattsburg, Vermont & Massachusetts, Vermont Valley, and Whitehall & Plattsburg Railroads.

The leases for these roads were transferred to the Vermont Central, at about the same time that the Rutland was leased to that company, and, of these roads, the V. V. and the M. & P. were the only ones whose motive power appears in the Rutland's locomotive history.

The M. & P. was a reorganization, in 1868, of the bankrupt Plattsburg & Montreal Railroad. In 1869, it acquired lease of the Whitehall & Plattsburg. Both roads were leased to the Rutland on January 23rd, 1871, and the lease was transferred to the Vermont Central and Vermont & Canada Railroads, on January 14th, 1873. On February 25th, of that year, control of the lines was purchased and they were merged with the New York & Canada, now part of the D. & H. The line extended from Plattsburg to Mooer's Jct., and it was by means of this road that Rutland freight was handled between Burlington and the O. & L. C. R. R., after being transported across Lake Champlain by steamer. The M. & P. eventually became part of the D. & H.

The M. & P. Locomotives

Rec'd	Name	Builder	C/N	Date	Type	Cyls.	DD	Remarks
1852	Clinton	Amoskeag	61	1852	4-4-0	14x20	60	Disposition unknown.
1852	Plattsburg	Taunton	106	1852	4-4-0	14x20	66	Renamed Saranac.
1852	Mooers	Taunton	112	1852	4-4-0	14x20	66	Disposition unknown.
1853	West Chazy	Taunton	144	1853	4-4-0	14x20	66	
1863	Saranac	Taunton	37	1849	4-4-0	16x20	54	ex-Rutland 3, "Vergennes."
1863	Col. Williams	Taunton	87	1851	4-4-0	14x20	66	ex-Rutland & Washington.
1863	Chazy	Hinkley	47	1845	4-2-0	11½x20	60	From Northern (N. Y.) R. R.
1869	Plattsburg	Taunton	32	1849	4-4-0	15x18	60	ex-Rutland 9, "Rutland."
1869	Cavendish	Taunton	77	1851	4-4-0	15x18	60	ex-Rutland 14, "Cavendish."
1871	Ticonderoga	Taunton	116	1852	4-4-0	14x20	55	Ret'd to Rutland. Sc 1880.

(The above roster was supplied by Mr. Robert R. Brown, Lachine, P. Q.)

"Plattsburg," No. 106, was sold, by 1863, to the Watertown & Rome R. R., where it was renamed "Antwerp."

"Mooers," No. 112, was repaired by Taunton, October, 1857, and renamed "S. F. Vilas."

"West Chazy" was sold in 1853 to the Providence & Worcester R. R., and renamed "Providence." Probably was never on the M. & P.

"Chazy" was originally Old Colony R. R. "Mayflower."
"Plattsburg," No. 32, went to the D. & H.

Mr. Brown also advises that "The Vermont Central Bulletin mentions a single-driver named "Scotia," but that was an engine belonging to the Montreal & N. Y. R. R. Its original name was either "Montreal" or "James G. Ferrier," more likely "Montreal." It was built in 1847 for the Montreal & Lachine R. R., by Kinmond, Hutton and Steele, of Dundee, Scotland. When the M. & N. Y. and the Champlain & St. Lawrence R. R. amalgamated in 1857, as the Montreal & Champlain R. R., they had two "Montreals," one a Baldwin 4-4-0, and a Kinmond 4-2-2, so, presumably the latter was renamed "Scotia."

Both the "Cavendish" and the "Ticonderoga" were later returned to the Rutland.

Incorporation of the Vermont Valley R. R. was authorized on Nov. 8th, 1848, under the laws of the State of Vermont, and, on May 12th, 1865, the road was leased to the Trustees of the Rutland & Burlington, this lease being assigned to the Vermont Central and the Vermont & Canada Railroads, on Jan. 23rd, 1871. The road extended from Bellows Falls to Brattleboro, where it connected with the Vermont & Massachusetts R. R., to eventually form part of the through line from Bellows Falls to Long Island Sound. At the time of the lease, the V. V. had four locomotives, as shown herewith, which were renumbered to Rutland Nos. 36 to 39, according to the Engineer's Report of 1873. Shortly thereafter, they were replaced by a second group bearing the same numbers, one of which was the V. V. engine numbered 39, changed to No. 40, and one was M. & P. No. 3, changed from No. 42 to No. 39.

A partial V. V. locomotive roster follows.

No.	Name	Builder	C/N	Date	Type	Cyls.	DD	Reb.	Rut.#
1	Putney	Rogers	267	7-2-51	4-4-0	14x20	66	1869	36
2	Dummerston	Rogers	264	6-17-51	4-4-0	14x20	66	1870	37
3	Westminster	Rogers	276	8-27-51	4-4-0	14x20	60		38
4	Brattleboro	Rogers	461	1-31-54	4-4-0	15x22	60	1869	39-40

There is photographic record of a V. V. No. 4, named "G. Morris," which appears to be a Danforth engine of the 1870's, but there is no evidence that this engine operated under Rutland control.

Lease of the V. V. was cancelled in 1892.

In connection with the numerous renumberings to which the Rutland's locomotives have been subjected, it might be well to keep in

mind the following items, which may help to explain some of the apparent irregularities which appear in the following rosters, or which may be encountered elsewhere.

The renumbering into the C. V. 200 series took place no earlier than 1886, and perhaps was not completed until about 1891. After being returned from C. V. control, the engines retained these 200 series numbers until late in 1901. It appears that the change of numbers to the 1901 series was made as the engines were shopped, although this statement cannot be confirmed. The renumbering into the N. Y. C. Lines series, in 1904-05, appears to have been done all at one time.

The N. Y. C. purchased control of the Rutland in 1904, and sold a one-half interest to the New Haven in 1911. This sale released the Rutland locomotives from the N. Y. C. number system, and the tenders of these engines were almost immediately re-lettered "Rutland." New locomotives, purchased in 1912, were so lettered, although the actual renumbering to the present (1913) series did not take place until 1914, or perhaps as late as 1915, the engines carrying their N. Y. C. Lines numbers in the interim A former employee of the Rutland recalls that this change of numbers took place within a period of "two weeks or so."

The unusual set-up used in Roster IV, showing the current equipment from 1913 to 1951, was made necessary in order to show the origin and record of each engine thereon, with the various numbers in chronological order. To do this necessitated showing the dimensions separately.

ROSTER I

This roster lists the engines of the Rutland & Burlington and Rutland Railroads, from 1847 to December 30th, 1870, when the Rutland was leased to the Vermont Central. It also includes the locomotives of lines under lease to the Rutland, the leases for which were eventually transferred to the Vermont Central. Some Rutland engines were disposed of prior to the lease and, therefore, did not pass into C. V. control. These are marked with an "X."

The roster further includes locomotives transferred to the Rutland Division, so-called, by the C. V., and shows the renumbering of the Rutland engines into the C. V. 200 series, which took place no earlier than 1886, and may have extended over several years.

The locomotives are arranged in the following order—

Nos. 1 to 35, from the Rutland Railroad.
Nos. 36 to 39, 1st series, from the Vermont Valley.
Nos. 40 to 42, 1st series, from Montreal & Plattsburg.
2nd Nos. 1, 9, 17 and 3rd No. 9, from the Central Vermont.
2nd Nos. 36 to 42, mostly from the Central Vermont.
2nd No. 211 and Nos. 231 to 235 *by* the Central Vermont, former A. & St. L. motive power.

(*) Indicates further data in the Roster Notes.

No.	Name	Builder	C/N	Date	Type	Cyls.	DD	Disp.	CV #
	Nantucket *	Hinkley	2	1841	4-2-0	10½x20	60	Sc 1855	X
	Vulcan *	R. Norris		1840				Sc 1855	X
1	Burlington	Taunton	33	1849	4-4-0	15x18	60	Sc 1887	
2	Charlotte *	Taunton	50	1850	4-4-0	16x20	54	Sc 1878	
3	Vergennes *	Taunton	37	1849	4-4-0	16x20	54	Sc 1887	
4	New Haven	J. Souther		1851	4-4-0	16x20	60	Unknown	
5	Middlebury *	Taunton	35	1849	4-4-0	15x18	60	Sold 1866	X
5	Middlebury	L. B. Tyng		1865	4-4-0	15x24	60	Sc 1892-5	202
6	Whiting *	Hinkley	6	1842	0-4-0	13½x20	48	Sc 1865	X
6	Benslide	Taunton	402	1867	0-4-0	15x22	44	Sc 1900	203
7	Brandon *	Taunton	45	1850	4-4-0	16x20	54	Sc 1886	
8	Pittsford *	Taunton	49	1850	4-4-0	16x20	54	So 1881	
9	Rutland *	Taunton	32	1849	4-4-0	15x18	60	To M&P	
10	Clarendon	Taunton	66	1851	4-4-0	15x18	60	Sc 1874	
11	Cuttingsville *	Bal'vale		1849	4-4-0			Sc 1868	X
11	Gov'r Page *	Taunton	447	1868	4-4-0	16x24	60		205
12	Mt. Holly *	Taunton	36	1849	4-4-0	16x20	54	So B&LM	
13	Ludlow *	Taunton	52	1850	4-4-0	15x18	60	So after 1878	
14	Cavendish *	Taunton	77	1851	4-4-0	15x18	60	Unknown	
15	Chester *	Taunton	48	1850	4-4-0	15x18	60	Sc 1892	206
16	Rockingham *	Bal'vale		1849	4-4-0			Sc 1868	X
16	Moosalamoo	Taunton	448	1868	4-4-0	16x24	60	Sc 1900	207
17	Bellows Falls *	Taunton	34	1849	4-4-0	15x18	60	Wr 1876	
18	Otter Creek *	Hinkley	548	1854	4-4-0	15x24	60	Sc 1892	209
19	Ethan Allen *	Hinkley	552	1854	4-4-0	15x24	60	Sc 1893	210
20	Gen'l Strong *	Taunton	78	1851	4-4-0	16x20	60	Sc 1891	211
21	Nathan Rice *	Amoskeag	50	1852	4-6-0	16x22	54		212
22	John Howe *	Amoskeag	51	1852	4-6-0	16x20	60	Sc 1890	
23	Tim. Follette *	Amoskeag	72	1853	4-4-0	16x22	60	Sc 1890	213
24	Sam'l Henshaw	Amoskeag	73	1853	4-6-0	15x20	60	Sc 1868	X
24	N. L. Davis	Taunton	426	1868	4-4-0	15x22	60	Sc 1900	214
25	Lake Dunmore *	Hinkley	546	1854	4-4-0	15x24	60	Sc 1893	215
26	Know Nothing *	Hinkley	549	1854	4-4-0	15x24	60	Sc 1893	216
27	Killington *	Taunton	355	1865	4-4-0	16x24	60		217
28	Addison *	Taunton	356	1865	4-4-0	16x24	60		218
29	Gov. Underwood *	Taunton	366	1865	4-4-0	16x22	66		219
30	Peter Butler *	Taunton	480	1869	4-4-0	16x24	60		220
31	John Simonds *	Taunton	483	1869	4-4-0	16x24	60		221
32	J. M. Haven	Rutland		1870	4-4-0	16x22	66	Sc 1900	222
33	Geo. B. Chase *	Taunton	509	1870	4-4-0	16x24	60		223
34	J. H. Williams	Taunton	512	1870	4-4-0	16x22	60	Sc 1900	224
35	Lawrence Barnes	Taunton	514	1870	4-4-0	16x24	60	Sc 1899	225
36	VV#1 Putney	Rogers	267	1851	4-4-0	14x20	66		
37	VV#2 Dummerston	Rogers	264	1851	4-4-0	14x20	66		
38	VV#3 Westminster	Rogers	276	1851	4-4-0	14x20	60		
39	VV#4 Brattleboro	Rogers	461	1854	4-4-0	15x22	60	To 2nd #40	
40	M&P Plattsburg	Taunton	32	1849	4-4-0	15x18	57	To D&H	
41	M&P Saranac	Taunton	37	1849	4-4-0	15x20	62	Sc 1887	
42	M&P Ticonderoga	Taunton	116	1852	4-4-0	14x20	55	To 2nd #39	

The following locomotives were added to the Rutland Division, by the C. V., either as additional equipment or to replace engines that had been disposed of.

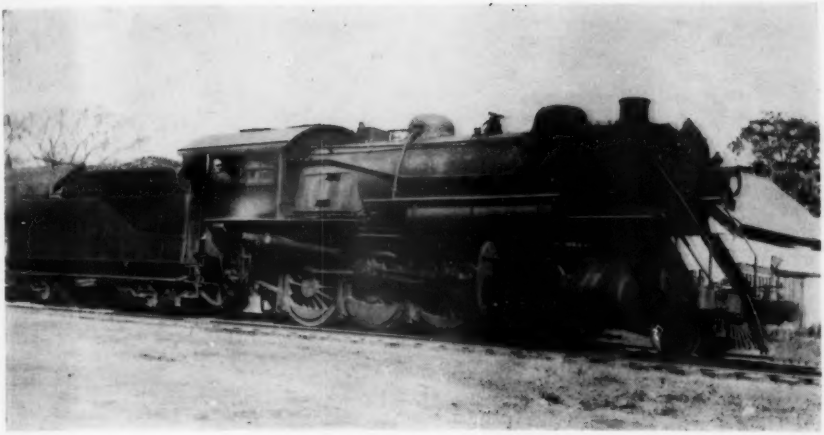
1	Burlington *	St. Albans		1872	4-4-0	17x24	68		201
9	Oswegatchie *	Hinkley	260	1850	4-4-0	15x18	66	Sc 1872-3	
9	Rutland *	St. Albans		1872	4-4-0	16x24	60		204
17	Chas. Clement *	St. Albans		1873	4-4-0	16x24	66		208
36	J. Burdette *	Taunton	466	1869	4-4-0	16x24	66	Fr #38	226
37	Shelburne *	Taunton	464	1869	4-4-0	16x24	66		227
38	J. Burdette *	Taunton	466	1869	4-4-0	16x24	66	To #36	
38	America *	Baldwin	2454	1871	2-6-0	17x24	54		228
39	Ticonderoga *	Taunton	116	1852	4-4-0	15x20	66	Sc 1880	
40	Brattleboro *	Rogers	461	1854	4-4-0	15x22	60	Fr 1st #39	
41	Salisbury *	Hinkley	403	1852	4-4-0	15x24	60	Reb. TLW 1873	
	Salisbury	Taunton (Reb)		1873	4-4-0	15x24	63		229
42	Rockingham *	Hinkley	194	1848	4-4-0	15x24	60		230
211 *		Schenect	3510	1891	0-4-0	16x24	50		211
231 *		Mason	583	1877	4-4-0	17x24	63		231
232 *		Schenect	3511	1891	4-4-0	18x24	69		232
233 *		Schenect	3512	1891	4-4-0	18x24	69		233
234 *		Schenect	3506	1891	4-6-0	18x24	56		234
235 *		Schenect	3505	1891	4-6-0	18x24	56		235

ADDITIONAL DATA. ROSTER I

These items are arranged in the same order as the locomotives appear in the foregoing roster.

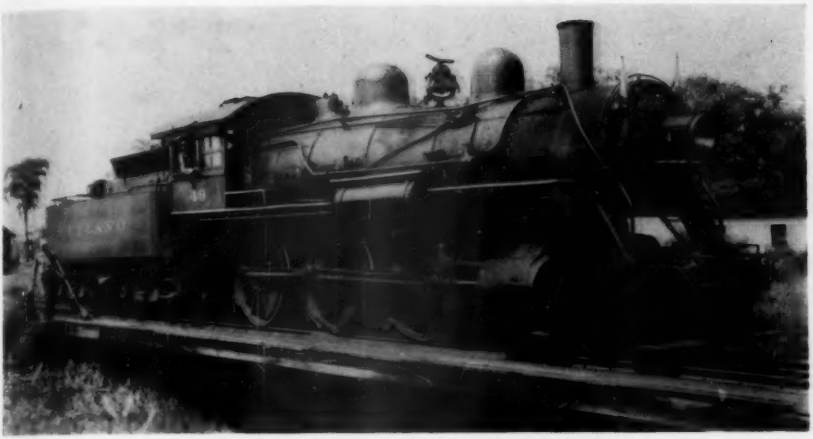
"Nantucket" was bought from the New Bedford & Taunton R. R. by Chamberlain, Strong & Co., the contractors who built the road. "Vulcan" was bought from the Boston & Worcester R. R., and was placed in service on Nov. 22nd, 1850. These two engines appear in the 1855 inventory, but were scrapped shortly thereafter. It is doubtful that they were ever numbered.

1. "Burlington" rebuilt at Rutland, October, 1865.
2. "Charlotte" rebuilt at Rutland, October, 1863.
3. "Vergennes" rebuilt at Rutland October, 1863. Sent to the M. & P. as the "Saranac." Returned to the Rutland on December 25th, 1873.
5. "Middlebury" wrecked at Pittsfield in November, 1864. After being rebuilt by Taunton, it was sold to the Fitchburg & Worcester, in 1866.
5. "Middlebury" rebuilt from a second hand engine, by L. B. Tyng, at Northfield Shops, October, 1865, and sold to the Rutland. Rebuilt at Rutland, 1870. Said to have been built for the U. S. M. R. R.
6. "Whiting" bought from the Boston & Worcester R. R., ex-Tiger, 1842.
7. "Brandon" rebuilt at Rutland in 1866 and 1871.
8. "Pittsford" rebuilt at Rutland in 1867. Sold to D. C. Linsley in June 1881. Renamed "Glengarry."
9. "Rutland" rebuilt at Rutland in 1869. Transferred to the M. & P. as the "Plattsburg," and went to the D. & H.
11. "Cuttingsville." ex-"Red Bird."
11. "Governor Page" renamed "L. E. Roys."
12. "Mt. Holly" rebuilt at Rutland, 1866. Sold to D. C. Linsley, of the Burlington & LaMoille R. R., as "William Hale."



Rutland #23. Schenectady #43042, 1907.

Rutland #48. Ex-2048-210. Schenectady #26833, 1902.



Rutland #49. Ex-2049-211. Manchester #26834, 1902.

Rutland #51. Ex-2051-213. Schenectady #26627, 1902.

13. "Ludlow" was running between Brattleboro and Bellows Falls on Nov. 15th, 1878.
14. "Cavendish" rebuilt at Rutland, 1865.
15. "Chester" rebuilt at Rutland, 1868.
16. "Rockingham," ex-"Brown Bird."
17. "Bellows Falls" rebuilt at Rutland, 1865. Wrecked on the Addison R. R., Oct. 31, 1876.
18. "Otter Creek" rebuilt 1871.
19. "Ethen Allen" renamed "Green Mountain" in 1855; "Wide Awake" in 1862; rebuilt at Rutland in 1867 and renamed "Pico."
20. "General Strong" rebuilt at Rutland in 1873.
21. "Nathan Rice" renamed "E. A. Birchard" in 1864, and rebuilt to 4-4-0, 16x24-60.
22. "John Howe" renamed "H. E. Chamberlain" in 1869, and rebuilt to 4-4-0, 16x20-60.
23. "Timothy Follette" renamed "Col. Merrill." Rebuilt in 1866 and 1875.
25. "Lake Dunmore" renamed "Dunmore." Rebuilt in 1868.
26. "Know Nothing" renamed "J. A. Conant" in 1855; "Ethan Allen" in 1862.
27. "Killington" rebuilt at Rutland, 1874.
28. "Addison" rebuilt at Rutland, 1878.
29. "Governor Underwood" renamed "J. Burdette." Rebuilt in 1877.
30. "Peter Butler" rebuilt in 1874.
31. "John Simonds" rebuilt in 1874.
33. "George B. Chase" received as "Geo. M. Barnard" and renamed at once.
1. "Burlington" ex-C. V. "Stowe," No. 63. Rebuilt 16x24.
9. "Oswegatchie" came from the Northern (NY) R. R.
9. "Rutland" sold to Manchester, Dorset & Granville No. 1.
17. "Charles Clement" ex-C. V. "Pacific," No. 24.
36. "J. Burdette" ex-C V. "W. C. Smith," No. 71. Renamed "E. W. Horner."
37. "Shelburne" ex-C. V. "St. Albans," No. 2.
38. "America" ex-C. V. "Pacific," No. 81.
39. "Ticonderoga" ex-C. V. "Stranger," No. 34.
40. "Brattleboro" ex-C. V. "Brattleboro." Scrapped before 1-1-76.
41. "Richford" ex-C. V. "Royalton," No. 35.
42. "Rockingham" ex-C. V. "Missisco," No. 25.
211. Ex-A. & St. L. No. 1.
231. Ex-B. & L. M. "Burlington."
232. Ex-A. & St. L. No. 11.
233. Ex-A. & St. L. No. 12.
234. Ex-A. & St. L. No. 32.
235. Ex-A. & St. L. No. 31.

ROSTER II

This roster contains the record of Rutland locomotives, which were numbered in the C. V. 200 series, plus those added to this series after cancellation of the C. V. lease in May, 1896, and prior to the renumbering in 1901. It includes the 300 series engines received from the Ogdensburg & Lake Champlain R. R. in 1899. Although the locomotives of the Bennington & Rutland Railway and the Chatham & Lebanon Valley R. R. were acquired during this period, they are not included in the roster, as they are accounted for in separate rosters of those roads.

(*) Indicates further data in the Roster Notes.

Engines' names can be found by referring to Roster I.

CV No.	Old No.	Builder	C/N	Date	Type	Cyls.	DD	Weights	Disp'n	1901
201	1	St. Albans		1872	4-4-0	17x24	68	72550		62
202	5	Northfield		1866	4-4-0	15x24	60	58300	Sc 1892-5	
203	6	Taunton	402	1867	0-4-0	15x22	54	48500	Sc 1900	
204	9	St. Albans		1872	4-4-0	16x24	60	74300	So. MD&G 1	
204	37	Taunton	464	1869	4-4-0	16x24	63	68100	Fr. 227	63
205	11	Taunton	447	1868	4-4-0	16x24	60	68100		64
206	15	Taunton	48	1850	4-4-0	15x20	60	58200		
207	16	Taunton	448	1868	4-4-0	16x24	60	68100	Sc 1900	
208	17	St. Albans		1873	4-4-0	16x24	66	72550		65
209	18	Hinkley	548	1854	4-4-0	15x24	60	Reb '71	Sc 1892	
210	19	Hinkley	552	1854	4-4-0	15x24	60	55450	Sc 1893	
211	20	Taunton	78	1851	4-4-0	16x20	60		Sc 1891	
211	—	Schenect	3510	1891	0-4-0	16x24	60	64800		80
212	21	Amoskeag	50	1852	4-4-0	16x24	60	68300		66
213	23	Amoskeag	72	1853	4-4-0	16x22	60	67000	Sc 1890	
214	24	Taunton	426	1868	4-4-0	15x22	66	67600	Sc 1900	
215	25	Hinkley	546	1854	4-4-0	15x24	60	57700	Sc 1893	
216	26	Hinkley	549	1854	4-4-0	15x24	60		Sc 1893	
217	27	Taunton	355	1865	4-4-0	16x24	60	62300		67
218	28	Taunton	356	1865	4-4-0	16x24	60	62300		68
219	29	Taunton	366	1865	4-4-0	16x22	66	67600		69
220	30	Taunton	480	1869	4-4-0	16x24	60	68100		70
221	31	Taunton	483	1869	4-4-0	16x24	60	68300		71
222	32	Rutland		1870	4-4-0	16x22	66	67600	Sc 1900	
223	33	Taunton	509	1870	4-4-0	16x24	60	68100		72
224	34	Taunton	512	1870	4-4-0	16x24	60	68100	Sc 1900	
225	35	Taunton	514	1870	4-4-0	16x24	60	68300	Sc 1899	
226	36	Taunton	466	1869	4-4-0	16x24	66	67500	Unknown	
227	37	Taunton	464	1869	4-4-0	16x24	63	68100	To 204	
228	38	Baldwin	2454	1871	2-6-0	17x24	54	74350		370
229	41	Hinkley	403	1852	4-4-0	15x24	60	52885	Sc 1897	
230	42	Hinkley	194	1848	4-4-0	15x24	60	51200	Unknown	
231	—	Mason	583	1877	4-4-0	17x24	63	73275		73
232	—	Schenect	3511	1891	4-4-0	18x24	69	100300		182
233	—	Schenect	3512	1891	4-4-0	18x24	69	105500		183
234	—	Schenect	3506	1891	4-6-0	18x24	56	115800		480
235	—	Schenect	3505	1891	4-6-0	18x24	56	115800		481
236	—	Schenect	4550	1897	4-4-0	18x24	69	110000		184
237	—	Schenect	4551	1897	4-4-0	18x24	69	110000		185
238*	—	Manchester	445	1872	4-4-0	15x22	66	66000		79
239	—	Schenect	5009	1899	2-6-0	19x26	57	121000		386
240	—	Schenect	5010	1899	2-6-0	19x26	57	121000		387

241	— Schenect	5109	1899	4-4-0	18x24	69	110000			186
242	— Schenect	5110	1899	4-4-0	18x24	69	110000			187
243*	— Schenect	5545	1900	4-4-0	18½x26	68	127000	So	1902	188
244*	— Brooks	3448	1900	4-4-0	18½x26	68	127000	So	1902	189
245	— Schenect	5405	1900	2-6-0	19x26	57	121000			388
246	— Schenect	5404	1900	2-6-0	19x26	57	121000			389
247	— Schenect	5406	1900	2-6-0	19x26	57	121000			390
248	— Schenect	5407	1900	2-6-0	19x26	57	121000			391
249*	— Brooks	2772	1897	4-4-0	19x26*	68	126500			190
250*	— Brooks	2774	1897	4-4-0	19x26*	68	126500			191
251*	— Schenect	4932	1898	4-6-0	20x28	61	161000			420
252*	— Schenect	4933	1898	4-6-0	20x28	61	161000			421
68*	— Rome		1889	4-6-0	18x24	64	99600			192
69*	— Schenect	2765	1889	4-6-0	18x24	64	99600			193

The following locomotives were placed on the Rutland, upon acquisition of the O. & L. C. in 1899, and retained their 300 series numbers until the renumbering of 1901.

303	Taunton	435	1868	4-4-0	16x24	60	62500	Sc 1900	
306	Mason	286	1868	4-4-0	16x24	60	62500		74
309	McKay & Aldus		1867	4-4-0	16x24	60	66000		
310	Malone		1865	4-4-0	15x24	60	60000		
313	Malone		1862	4-4-0	15x20	54	55000		75
314	Baldwin	8309	1886	2-6-0	19x24	54	93000		392
317	Portland	456	1882	2-6-0	18x24	54	81800		382
318	Baldwin	10638	1890	2-6-0	19x26	54	107000		393
319	Portland	457	1882	2-6-0	18x24	54	81800		383
320	Baldwin	10914	1890	2-6-0	19x26	54	107000		394
321	Baldwin	8310	1886	2-6-0	19x24	54	93000		395
322	Baldwin	10916	1890	2-6-0	19x26	54	107000		396
323	Baldwin	10917	1890	2-6-0	19x26	54	107000		397
324	Baldwin	10924	1890	4-4-0	17x24	66	86000		172
326	Baldwin	10926	1890	4-4-0	17x24	66	86000		173
327	Malone		1872	4-4-0	16x24	54	66200		76
329	Rh. Is'd	1584	1885	2-6-0	19x24	54	100000		398
330	Rh. Is'd	1585	1885	2-6-0	19x24	54	100000		399
331	Malone		1870	4-4-0	16x24	60	73500	Sc 1900	
336*	Rh. Is'd	2983	1894	4-6-0	19x24	56	112000		490
337*	Rh. Is'd	2984	1894	4-6-0	19x24	56	112000		491
338*	Rh. Is'd	2985	1894	4-6-0	19x24	56	112000		492
339*	Schenect	4645	1897	2-8-0	22&34x28	54	153000		550
340*	Schenect	4646	1897	2-8-0	22&34x28	54	153000		551
341*	Schenect	4647	1897	2-8-0	22&34x28	54	153000		552
342*	Baldwin	4392	1879	4-6-0	19x24	51			519

ADDITIONAL DATA. ROSTER II

238. Present information indicates that this engine was originally New London Northern No. 20; later C. V. No. 170 and transferred by the C. V. to St. L. & A. No. 1, after which it became Rutland No. 238 and finally No. 79.

243. Sold to the Canadian Pacific, their Nos. 2nd 180, 298 and 198.

244. Ordered as B. & R. No. 16. Delivered as Rutland No. 244. Sold to the Canadian Pacific, their Nos. 2nd 181, 299 and 199.

249-250. Ex-St. L & A. Nos. 5 and 7. Cylinders changed to 18″x26″.
251-252. Ex-St. L. & A. Nos. 8 and 9.
68. Ex-N. Y. C. No. 691.
69. Ex-N. Y. C. No. 698.
336-338. Ordered by Smith & Hanfield, Contractors, as Nos. 61, 62 and 63. Delivered as O. & L. C. Nos. 336, 337 and 338.
339-341. Received as cross-compounds. Changed to simple, 19″x28″.
342. Built as B. N. Y. & P. No. 1, and was sold or transferred to the Western New York & Pennsylvania R. R., and was later sold to the O. & L. C.

THE LOCOMOTIVES, 1896 to 1951

The lease of the Rutland Railroad to the Central Vermont was cancelled on May 7th, 1896, and there appears to be no authentic record of the locomotives returned at that time, by the Central Vermont. The report of the Vermont Railroad Commission for the year 1898 credits the Rutland with 29 locomotives, whose exact identity is a matter of some speculation, but available information indicates that they may have been those marked (*) in the following roster.

These engines had been numbered in the C. V. 200 series and retained the same numbers on the Rutland until the 1901 renumbering. Since it is reported that the C. V. had 139 locomotives in 1896, and 111 in 1897, it would appear that the C. V. returned 28 to the Rutland, and it is assumed herein that all of the 28 engines on the Rutland Division roster (C. V. 200 series) were returned, leaving the 29th engine in doubt. Of these 29 only 19 survived until the 1901 renumbering, and the other 10 are listed in a separate, short roster.

The Rutland added at least 56 more engines to its roster before this renumbering, some of these coming by purchase of new power, others from acquired roads, viz., O. & L. C., Bennington & Rutland Ry. and Chatham & Lebanon Valley R. R. Five of the original 29 Rutland engines were former A & St. L. power that had been assigned to the Rutland Division.

During 1902, twenty-one new locomotives were purchased, bringing to 106 the number of engines owned by the Rutland, between the cancellation of the C. V. lease, in 1896, and the renumbering of Rutland motive power into the N. Y. C. series, in 1905. Due to sales and other disposition only 77 were changed into that series.

In 1913, the N. Y. C. released the Rutland locomotives from its numbering system, and the Rutland instituted its own system, in most cases by merely dropping the first two digits of the N. Y. C. numbers. Because of duplication this was not possible in all cases, and a few of the older engines continued to carry the N. Y. C. numbers until scrapped.

These 13 were Nos. 50, 793, 794, 796, 797, 1060, 1063, 1880, 1881, 1892, 1893, 1898 and 1899. A few others were given new numbers which bore no relation at all to the old ones.

1901 Series No.
60
61
62*
63*
64*
65*
66*
67*
68*
69*
70*
71*
72*
73*
74
75
76
77

Record of the company's engines from this change in 1913 up to the present time (1951) is shown in Roster IV.

The year 1950 witnessed the first use of Diesel power on the Rutland. Trials were made with an ALCo 1600 H.P. road switcher, No. 1601, and concurrently with an EMD diesel, Bangor & Aroostook No. 568. The first train service run was made on trains 88 and 83, between Rutland and Chatham, on December 19th, 1950, with the No. 1601. This machine was subsequently purchased as part of an order for five similar, and was numbered 200, the others being 201 to 204, and were placed in service during the first half of 1951. Six 1000 H. P. Diesels, Nos. 400 to 405, were later ordered from the American Locomotive Company, the first of which were placed in service late in 1951.

Use of steam power on the Chatham Branch (the former C. & L. V. R. R.) was discontinued on June 30th, 1951, when the engine shed and coaling station at Chatham, N. Y. were permanently closed. However, arrangements were made to handle the annual Exchange Club excursion, Chatham to Rutland, with steam power, on September 30th, 1951.

Painting the engines of the 90 class a bright green, when they were built, caused much favorable comment, and gave the locomotives a fine appearance, when the paint was new, but, with lack of proper care, they soon took on a grimy coat, which could hardly be distinguished from black paint, and the green coat was soon discarded. Because of their fine coloring and "snappy" performance, these handsome 4-8-2's were known as the "Green Hornets."

ROSTER III

Rutland Locomotives. Series 1896-1901 and 1901-1905. Original 29 marked*

1901 Series No.	Prior Rd or 1896 #		Builder	C/N	Date	Type	Cyls.	DD	Wt.	Series 1905 NYC#	Series 1913 No.
60	B&R	8	Schenect	563	1869	4-4-0	16x24	69	77000	1060	1060
61	B&R	9	Schenect	564	1869	4-4-0	16x24	69	77000	1061	——
62*		201	St. Albans		1872	4-4-0	16x24	68	72550	——	——
63*	(a)	204	Taunton	464	1869	4-4-0	16x24	63	68100	——	——
64*		205	Taunton	447	1868	4-4-0	16x24	60	68100	1064	——
65*		208	St. Albans		1873	4-4-0	16x24	66	72550	1058	——
66*		212	Amoskeag	50	1852	4-4-0	16x24	60	68300	——	——
67*		217	Taunton	355	1865	4-4-0	16x24	60	62300	——	——
68*		218	Taunton	356	1865	4-4-0	16x24	60	62300	——	——
69*		219	Taunton	366	1865	4-4-0	16x24	66	67600	——	——
70*		220	Taunton	480	1869	4-4-0	16x24	60	68100	——	——
71*		221	Taunton	483	1869	4-4-0	16x24	60	68300	——	——
72*		223	Taunton	509	1870	4-4-0	16x24	60	68100	——	——
73*	(b)	231	Mason	583	1877	4-4-0	17x24	60	73275	——	——
74	O&LC	306	Mason	286	1868	4-4-0	16x24	60	62500	——	——
75	O&LC	313	Malone		1862	4-4-0	15x20	54	55000	——	——
76	O&LC	327	Malone		1872	4-4-0	16x24	54	66200	1059	——
77	C&LV	3	D. C. & Co.		1854	4-4-0	15x20	60		——	——

78	C&LV	5	Brooks	910	1883	4-4-0	14x22	56		—	—
79		238	Manch'r	445	1872	4-4-0	15x22	66	66000	—	—
80*		211	Schenect	3510	1891	0-4-0	16x24	51	64800	50	50
81			Manch'r	26419	1902	0-6-0	18x24	51	101700	447	102
82			Manch'r	26420	1902	0-6-0	18x24	51	101700	448	103
83			Manch'r	26421	1902	0-6-0	18x24	51	101700	449	104
100	(c) NYC	49	Schenect	4401	1896	4-4-0	14x22	63	78700	33	99
170	B&R	11	Schenect	1918	1884	4-4-0	17x24	64	84500	793	793
171	B&R	12	Schenect	1919	1884	4-4-0	17x24	64	84500	794	794
172	O&LC	324	Baldwin	10924	1890	4-4-0	17x24	69	87900	795	—
173	O&LC	326	Baldwin	10925	1890	4-4-0	17x24	69	87900	796	796
174	C&LV	6	Baldwin	10841	1890	4-4-0	17x24	63		797	797
175	C&LV	9	Baldwin	10849	1890	4-4-0	17x24	63		798	—
176	(d) NYC	471	Schenect	1713	1883	4-4-0	17x24	64	79800	—	—
177	NYC	1076	N. Y. C.		1872	4-4-0	17x24	70	81300	1062	—
180	B&R	14	Schenect	4199	1894	4-4-0	18x24	64		864	84
181	B&R	15	Schenect	4200	1894	4-4-0	18x24	64		865	85
182*	(e)	232	Schenect	3511	1891	4-4-0	18x24	69	103000	862	82
183*	(f)	233	Schenect	3512	1891	4-4-0	18x24	69	103000	863	83
184		236	Schenect	4550	1897	4-4-0	18x24	69	110000	866	86
185		237	Schenect	4551	1897	4-4-0	18x24	69	110000	867	87
186		241	Schenect	5109	1899	4-4-0	18x24	69	110000	868	88
187		242	Schenect	5110	1899	4-4-0	18x24	69	110000	869	89
188	(g)	243	Schenect	5545	1900	4-4-0	18½x26	69	127000	—	—
189	(h)	244	Brooks	3448	1900	4-4-0	18½x26	69	127000	—	—
190	SL&A	5	Brooks	2772	1897	4-4-0	18x26	68	126000	1000	80
191	SL&A	7	Brooks	2774	1897	4-4-0	18x26	68	126000	1001	81
192	(p)	68	Rome		1889	4-4-0	18x24	64	99600	—	—
193	(p)	69	Schenect	2765	1889	4-4-0	18x24	64	99600	1063	1063
200			Schenect	26413	1902	4-6-0	20x26	69	154000	2040	40
201			Schenect	26414	1902	4-6-0	20x26	69	154000	2041	41
202			Manch'r	26415	1902	4-6-0	20x26	69	154000	2042	42
203			Manch'r	26416	1902	4-6-0	20x26	69	154000	2043	43
204			Manch'r	26417	1902	4-6-0	20x26	69	154000	2044	44
205			Manch'r	26418	1902	4-6-0	20x26	69	154000	2045	45
206			Schenect	26574	1902	4-6-0	20x26	69	154000	2046	46
207			Schenect	26575	1902	4-6-0	20x26	69	154000	2047	47
210			Schenect	26833	1902	4-6-0	20x26	69	158000	2048	48
211			Schenect	26834	1902	4-6-0	20x26	69	158000	2049	49
212			Schenect	26626	1902	4-6-0	21x26	63	168000	2050	50
213			Schenect	26627	1902	4-6-0	21x26	63	168000	2051	51
320	SL&A	3	Schenect	5591	1900	2-6-0	20x28	57	155200	1884	144
321	SL&A	4	Schenect	5592	1900	2-6-0	20x28	57	155200	1885	145
370*		228	Baldwin	2454	1871	2-6-0	17x24	54	74350	1879	—
380	B&R	5	Schenect	3351	1891	2-6-0	18x24	55	104000	1880	1880
381	B&R	6	Schenect	3352	1891	2-6-0	18x24	55	104000	1881	1881
382	O&LC	317	Portland	456	1882	2-6-0	18x24	54	81000	1882	—
383	O&LC	319	Portland	457	1882	2-6-0	18x24	54	81000	1883	—
386		239	Schenect	5009	1899	2-6-0	19x26	57	121000	1886	146
387		240	Schenect	5010	1899	2-6-0	19x26	57	121000	1887	147
388		245	Schenect	5405	1900	2-6-0	19x26	57	121000	1888	148
389		246	Schenect	5404	1900	2-6-0	19x26	57	121000	1889	149
390		247	Schenect	5406	1900	2-6-0	19x26	57	121000	1890	150
391		248	Schenect	5407	1900	2-6-0	19x26	57	121000	1891	151
392	O&LC	314	Baldwin	8309	1886	2-6-0	19x24	57	98600	1892	1892
393	O&LC	318	Baldwin	10638	1890	2-6-0	19x24	57	110000	1895	153
394	O&LC	320	Baldwin	10914	1890	2-6-0	19x24	57	110000	1894	152
395	O&LC	321	Baldwin	8310	1886	2-6-0	19x24	57	98600	1893	1893
396	O&LC	322	Baldwin	10916	1890	2-6-0	19x24	57	110000	1896	154
397	O&LC	323	Baldwin	10917	1890	2-6-0	19x24	57	110000	1897	155
398	O&LC	329	R. I.	1584	1885	2-6-0	19x24	58	100700	1898	1898

399	O&LC	330	R. I.	1585	1885	2-6-0	19x24	58	100700	1899	1899
420	(i)	251	Schenect	4932	1898	4-6-0	20x28	61	161000	2153	
									Re	2063	63
421	(j)	252	Schenect	4933	1898	4-6-0	20x28	61	161000	2154	
									Re	2064	64
422			Schenect	26576	1902	4-6-0	21x26	63	165000	2052	52
423			Schenect	26577	1902	4-6-0	21x26	63	165000	2053	53
480*	(k)	234	Schenect	3506	1891	4-6-0	18x24	57	116000	2155	
									Re	2061	61
481*	(l)	235	Schenect	3505	1891	4-6-0	18x24	57	116000	2156	
									Re	2062	62
482			Schenect	26628	1902	4-6-0	21x26	63	165000	2054	54
483			Schenect	26629	1902	4-6-0	21x26	63	165000	2055	55
484			Schenect	26630	1902	4-6-0	21x26	63	165000	2056	56
485			Schenect	26631	1902	4-6-0	21x26	63	165000	2057	57
490	(m) O&LC	336	R. I.	2983	1893	4-6-0	19x24	57	112000	2157	
									Re	2060	60
491	(m) O&LC	337	R. I.	2984	1893	4-6-0	19x24	57	112000	2158	
									Re	2058	58
492	(m) O&LC	338	R. I.	2985	1893	4-6-0	19x24	57	112000	2159	
									Re	2059	59
519	(n) O&LC	342	Baldwin	4392	1879	4-6-0	19x24	51	108200	2265	——
550	(o) O&LC	339	Schenect	4645	1897	2-8-0	19x28	55	153000	2424	
									Re	2401	10
551	(o) O&LC	340	Schenect	4646	1897	2-8-0	19x28	55	153000	2425	
									Re	2402	11
552	(o) O&LC	341	Schenect	4647	1897	2-8-0	19x28	55	153000	2426	
									Re	2403	12

Of the "original" 28 locomotives returned by the C. V. to the Rutland, the following 10 were disposed of prior to the 1901 renumbering, and have not been included in the above roster.

C. V. Series No.	Builder	C/N	Date	Type	Cyls.	DD	Disp'n		
203*	Taunton	402	1867	0-4-0	15x22	44	Sc	1900	
204*	St. Albans		1872	4-4-0	16x24	68	So	1902	(MD&G)
207*	Taunton	448	1868	4-4-0	16x24	60	Sc	1900	
214*	Taunton	426	1868	4-4-0	16x22	66	Sc	1900	
222*	Rutland		1870	4-4-0	16x22	66	Sc	1900	
224*	Taunton	512	1870	4-4-0	16x22	60	Sc	1900	
225*	Taunton	514	1870	4-4-0	16x24	60	Sc	1899	
226*	Taunton	466	1869	4-4-0	16x24	66	Sc	?	
229*	Hinkley	403	1852	4-4-0	15x24	60	Sc	1897	
230*	Hinkley	194	1848	4-4-0	15x24	60	Sc	?	

ADDITIONAL DATA. ROSTER III

a. ex-227.
b. ex-Burlington & La Moille "Burlington."
c. Inspection engine "Ne-Ha-Sa-Ne." Ex-StL&A No. 10; NYC&HR No. 49; Rutland No. 100; NYC Lines No. 33; Rutland No. 99.
d. N. Y. C. No. 532 to No. 471.
e. ex-A. & St. L. No. 11.

f. ex-A. & St. L. No. 12.
g. Sold 1902. C. P. R. 2nd No. 180-298-198.
h. Sold 1902. C. P. R. 2nd No. 181-299-199.
i. ex-St. L. & A. No. 8.
j. ex-St. L. & A. No 9.
k. ex-A. & St. L. No. 31.
l. ex-A. & St. L. No. 32.
m. Ordered by Smith & Hanfield, Contractors. Delivered to O. & L. C.
n. Built as Buffalo, New York & Philadelphia No. 1. Was sold or transferred to the Western New York & Pennsylvania, and later sold to the O. & L. C.
o. Built as cross-compounds, cylinders 22″ & 34″x28″. Changed to simple, 19″x28″.
p. Nos. 68 and 69, ex-NYC Nos. 691 and 698, respectively.

LOCOMOTIVES SCRAPPED. 1901 and 1905 Series

1901 No.	1905 No.	Date Scrapped
61	1061	8-1906
64	1064	2-1908
65	1058	5-1909
76	1059	8-1906
80	50	ab 1914
172	795	5-1910
175	798	9-1912*
177	1076	5-1908
370	1879	6-1909
382	1882	7-1911
383	1883	11-1909
519	2265	12-1911

* Totally demolished in wreck with Milk Train pulled by #2044, at Soldiers' Home Crossing, Bennington, Vt., Sept. 7th, 1912.

ROSTER IV

RUTLAND LOCOMOTIVES AS OF THE 1913 RENUMBERING

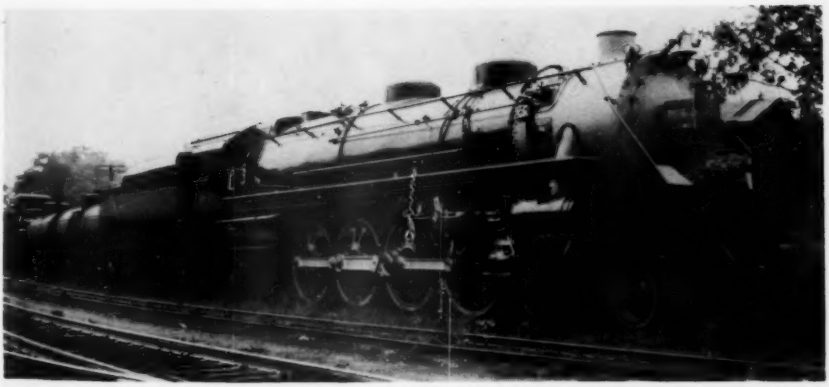
1913 Nos.	NYC Nos. 1905	Nos. 1901 1905	Nos. 1896 1901	Prior Road & No.	Builder	C/N	Date	Type	Ret'd.
10	2424 re 2401	550		OLC 339	Schenect	4645	1897	2-8-0	6-1934
11	2425 re 2402	551		OLC 340	Schenect	4646	1897	2-8-0	1-1934
12	2426 re 2403	552		OLC 341	Schenect	4647	1897	2-8-0	1-1934
14	2414				Schenect	48011	1910	2-8-0	5-1951
15	2415				Schenect	48012	1910	2-8-0	3-1951
16	2416				Schenect	48013	1910	2-8-0	8-1951
17	2417				Schenect	48014	1910	2-8-0	4-1948
18	2418				Schenect	43037	1907	2-8-0	5-1948
19	2419				Schenect	43038	1907	2-8-0	9-1947
20	2420				Schenect	43039	1907	2-8-0	10-1949
21	2421				Schenect	43040	1907	2-8-0	12-1949

Rutland #63. Ex-2063-2153-420-251. Built as St. L. & A. #8. Schenectady #4932, 1898.

Rutland #67. Ex-82-862-182-232. Built as A. & St. L. #11. Schenectady #3511, 1891

Rutland #74. Schenectady #51564, 1912.

Rutland #88, on the Chatham local. Ex-868-186-241. Schenectady #5109, 1899.



Rutland #90. Schenectady #74376, 1946. En route from the Schenectady Works to Rutland, Vt.

22	2422					Schenect	43041	1907	2-8-0		10-1939
23	2423					Schenect	43042	1907	2-8-0		11-1951
24	2424					Schenect	50150	1911	2-8-0		12-1950
25	2425					Schenect	50151	1911	2-8-0		4-1951
26	2426					Schenect	53280	1913	2-8-0		1-1952
27	2427					Schenect	53281	1913	2-8-0		6-1951
28	2428					Schenect	53282	1913	2-8-0		8-1951
29	2429					Schenect	53283	1913	2-8-0		9-1952
30	2430					Schenect	53284	1913	2-8-0		12-1951
31	2431					Schenect	53285	1913	2-8-0		1-1952
32						Schenect	59609	1918	2-8-2		11-1951
33						Schenect	59610	1918	2-8-2		8-1951
34						Schenect	59611	1918	2-8-2		8-1952
35						Schenect	59612	1918	2-8-2		12-1951
36						Schenect	59613	1918	2-8-2		10-1951
37						Schenect	59614	1918	2-8-2		11-1951
38	2038					Schenect	47310	1910	4-6-0	To #72	
39	2039					Schenect	47311	1910	4-6-0	To #73	
40	2040	200				Schenect	26413	1902	4-6-0		4-1951
41	2041	201				Schenect	26414	1902	4-6-0		4-1935
42	2042	202				M'chester	26415	1902	4-6-0		1-1935
43	2043	203				M'chester	26416	1902	4-6-0		11-1939
44	2044	204				M'chester	26417	1902	4-6-0		8-1939
45	2045	205				M'chester	26418	1902	4-6-0		12-1950
46	2046	206				Schenect	26574	1902	4-6-0		1-1932
47	2047	207				Schenect	26575	1902	4-6-0		1-1934
48	2048	210				Schenect	26833	1902	4-6-0		7-1946
49	2049	211				Schenect	26834	1902	4-6-0		2-1951
50	50	80	211	ASL	1	Schenect	3510	1891	0-4-0		ab 1915
50	2050	212	(see note)			Schenect	26626	1902	4-6-0		4-1951
51	2051	213				Schenect	26627	1902	4-6-0		12-1951
52	2052	422				Schenect	26576	1902	4-6-0		9-1951
53	2053	423				Schenect	26577	1902	4-6-0		11-1951
54	2054	482				Schenect	26628	1902	4-6-0		10-1946
55	2055	483				Schenect	26629	1902	4-6-0		4-1948
56	2056	484				Schenect	26630	1902	4-6-0		4-1948
57	2057	485				Schenect	26631	1902	4-6-0		6-1950
58	2158	491		OLC	337	Rh. Island	2984	1893	4-6-0		12-1921
re	2058										
59	2159	492		OLC	338	Rh. Island	2985	1893	4-6-0		12-1921
re	2059										
60	2157	490		OLC	336	Rh. Island	2983	1893	4-6-0		1-1919
re	2060										
61	2155	480	234	ASL	31	Schenect	3506	1891	4-6-0		12-1926
re	2061										
62	2156	481	235	ASL	32	Schenect	3505	1891	4-6-0		12-1918
re	2062										
63	2153	420	251	SLA	8	Schenect	4932	1898	4-6-0		6-1939
re	2063										
64	2154	421	252	SLA	9	Schenect	4933	1898	4-6-0		6-1939
re	2064										
65	1000	190	249	SLA	5	Brooks	2772	1897	4-4-0	Fr #80	12-1935
66	1001	191	250	SLA	7	Brooks	2774	1897	4-4-0	Fr #81	9-1926
67	862	182	232	ASL	11	Schenect	3511	1891	4-4-0	Fr #82	1-1932
70	2036					Schenect	47308	1910	4-6-0		9-1951
re	2070										
71	2037					Schenect	47309	1910	4-6-0		10-1951
re	2071										
72	2038					Schenect	47310	1910	4-6-0	Fr #38	10-1951
73	2039					Schenect	47311	1910	4-6-0	Fr #39	1-1952
74	2074					Schenect	51564	1912	4-6-0		8-1953

75	2075					Schenect	51565	1912	4-6-0		11-1951
76	2076					Schenect	51566	1912	4-6-0		8-1952
77	2077					Schenect	51567	1912	4-6-0		10-1951
78	2078					Schenect	51568	1912	4-6-0		11-1951
79	2079					Schenect	51569	1912	4-6-0		12-1951
80	1000	190	249	SLA	5	Brooks	2772	1897	4-4-0	To #65	12-1935
80						Schenect	66327	1925	4-6-2		
81	1001	191	250	SLA	7	Brooks	2774	1897	4-4-0	To # 66	9-1926
81						Schenect	66328	1925	4-6-2		
82	862	182	232	ASL	11	Schenect	3511	1891	4-4-0	To #67	1-1932
82						Schenect	66329	1925	4-6-2		8-1952
83	863	183	233	ASL	12	Schenect	3512	1891	4-4-0	So	10-1920
83						Schenect	68052	1929	4-6-2		9-1952
84	864	180				Schenect	4199	1894	4-4-0	So	10-1920
84						Schenect	68053	1929	4-6-2		12-1951
85	865	181		B&R	15	Schenect	4200	1894	4-4-0	So	10-1920
85						Schenect	68054	1929	4-6-2		1-1953
86	866	184	236			Schenect	4550	1897	4-4-0		1-1932
87	867	185	237			Schenect	4551	1897	4-4-0		1-1932
88	868	186	241			Schenect	5109	1899	4-4-0		2-1936
89	869	187	242			Schenect	5110	1899	4-4-0		1-1932
90						Schenect	74376	1946	4-8-2		
91						Schenect	74377	1946	4-8-2		
92						Schenect	74378	1946	4-8-2		
93						Schenect	74379	1946	4-8-2		
99	33	100	NYC	49	SLA 10	Schenect	4401	1896	4-4-0	Obs'n	5-1936
100	445					Cooke	43035	1907	0-6-0		9-1952
101	446					Cooke	43036	1907	0-6-0		1-1951
102	447	81				M'chester	26419	1902	0-6-0		7-1945
103	448	82				M'chester	26420	1902	0-6-0		8-1946
104	449	83				M'chester	26421	1902	0-6-0		8-1946
105	450					M'chester	53286	1913	0-6-0		12-1951
106	451					Schenect	54887	1914	0-6-0		9-1953
107	(Bought 3-29-46)			C&P	9	Schenect	66084	1924	0-6-0		9-1953
109						Pittsburg	60158	1918	0-8-0		11-1951
110						Pittsburg	60159	1918	0-8-0		12-1951
144	1884	320		SLA	3	Schenect	5591	1900	2-6-0		7-1946
145	1885	321		SLA	4	Schenect	5592	1900	2-6-0		7-1946
146	1886	386	239			Schenect	5009	1899	2-6-0		6-1934
147	1887	387	240			Schenect	5010	1899	2-6-0		1-1934
148	1888	388	245			Schenect	5405	1900	2-6-0		5-1936
149	1889	389	246			Schenect	5404	1900	2-6-0		8-1936
150	1890	390	247			Schenect	5406	1900	2-6-0		10-1940
151	1891	391	248			Schenect	5407	1900	2-6-0		12-1928
152	1894	394	320	OLC	320	Baldwin	10914	1890	2-6-0		7-1923
153	1895	393	318	OLC	318	Baldwin	10638	1890	2-6-0		7-1927
154	1896	396	322	OLC	322	Baldwin	10916	1890	2-6-0		3-1921
155	1897	397	323	OLC	323	Baldwin	10917	1890	2-6-0		7-1923
793	793	170		B&R	11	Schenect	1918	1884	4-4-0		1-1919
794	794	171		B&R	12	Schenect	1919	1884	4-4-0		11-1926
796	796	173	326	OLC	326	Baldwin	10925	1890	4-4-0		5-1916
797	797	714		C&LV	6	Baldwin	10841	1890	4-4-0		11-1915
1060	1060	60		B&R	8	Schenect	563	1869	4-4-0		7-1914
1063	1063	193		NYC	698	Schenect	2765	1889	4-4-0		1-1919
1880	1880	380		B&R	5	Schenect	3351	1891	2-6-0		7-1918
1881	1881	381		B&R	6	Schenect	3352	1891	2-6-0		12-1920
1892	1892	392	314	OLC	314	Baldwin	8309	1886	2-6-0		11-1915
1893	1893	395	321	OLC	321	Baldwin	8310	1886	2-6-0		5-1913
1898	1898	398	329	OLC	329	Rh. Island	1584	1885	2-6-0		9-1913
1899	1899	399	330	OLC	330	Rh. Island	1585	1885	2-6-0		12-1914

1st Nos. 83, 84 and 85 were sold to the Fort Smith & Western, becoming Nos. 4, 6 and 5, respectively, on that road.

Abbreviations Used

ASL	Adirondack & St. Lawrence R. R.
B&R	Bennington & Rutland Ry.
C&LV	Chatham & Lebanon Valley R. R.
C&P	Clarendon & Pittsford R. R. (Vermont Marble Company)
OLC	Ogdensburg & Lake Champlain R. R.
SLA	St. Lawrence & Adirondack R. R.

No. 50. This number was used concurrently on the 0-4-0 and the 4-6-0 for a short time, until the former was scrapped.

	Nos.	Cyls.	DD	Valves	Valve Gear	Weights OD	Weights Total	
	10-12	19x28	54	Slide	Stephenson	135500	153000	
	14-17	22x30	63	Piston	Stephenson	187000	211000	To 22½x30, #17
	18-23	22x30	63	Piston	Stephenson	186000	209000	To 22½x30, all
	24-25	22½x30	63	Piston	Stephenson	188000	213000	
	26-31	22½x30	63	Piston	Stephenson	188000	213000	
	32-37	26x30	63	Piston	Walschaert	220000	292000	
	40-47	20x26	69	Piston	Stephenson	115000	154000	
	48-49	20x26	69	Piston	Stephenson	117000	158000	
	50-55	21x26	63	Piston	Stephenson	132000	168000	
	56-57	21x26	63	Piston	Stephenson	130000	165000	
	58-60	19x24	57	Slide	Stephenson	82000	112000	
	61-62	18x24	57	Slide	Stephenson	91000	116000	
	63-64	20x28	61	Slide	Stephenson	123000	161000	
	65	18x26	68	Piston	Stephenson	84000	126000	
	66	18x26	68	Slide	Stephenson	84000	126000	
	67	18x24	69	Slide	Stephenson	70000	106000	
	70-71	22x26	69	Piston	St. to Wals	159000	204000	To 22½x26
	72-73	22x26	69	Piston	St. to Wals	148000	198000	To 22½x26
	74-79	22½x26	69	Piston	Walschaert	155000	211000	
1st	80-81	18x26*	68	Piston**	Stephenson	84000	126000	To 65-66
1st	82-83	18x24	69	Slide	Stephenson	70000	106000	82 to 67
1st	84-85	18x24	70	Slide	Stephenson	70000	106000	
2nd	80-82	25x28	69	Piston	Walschaert		278000	
2nd	83-85	25x28	73	Piston	Walschaert	175800	292500	
	86-89	18x24	69	Slide	Stephenson	70000	110000	
	90-93	26x30	73	Piston	Walschaert	232000	348000	
	99	14x22	63	Slide	Stephenson	49700	78700	
	100-101	19x26	51	Slide	Stephenson	136000	136000	
	102-104	18x24	51	Slide	Stephenson	101000	101000	
-	105	19x26	51	Slide	Stephenson	139000	139000	
-	106	20x26	51	Piston	Walschaert	144000	144000	
-	107	21x28	57	Piston	Walschaert	168000	168000	
	109-110	25x28	51	Piston	Baker	214000	214000	
	144-145	20x28	57	Slide	Stephenson	135000	155000	
	146-151	19x26	57	Slide	Stephenson	103000	121000	
	152-155	19x26	57	Slide	Stephenson	91000	110000	

* 1st #80, cylinders changed to 19x26, when superheated in June, 1916.
** 1st #81, Piston valve cylinders replaced by slide valves.
Walschaert valve gear applied to #70 in Feb. 1917; #71, Nov. 1917; #72, Feb. 1920; #73, Aug. 1920.
Superheaters applied to #70 in Aug. 1913; #71, June, 1914; #72, Feb. 1920; #73, Aug. 1920.

793-794	17x24	64	Slide	Stephenson	60000	84000
796	17x24	66	Slide	Stephenson		86000
797	17x24	63	Slide	Stephenson		80000
1060	16x24	69	Slide	Stephenson		77000
1063	18x24	64	Slide	Stephenson	64000	99600
1880-81	18x24	55	Slide	Stephenson	88800	104000
1892-93	19x24	54	Slide	Stephenson		93000
1898-99	19x24	54	Slide	Stephenson		100000

RUTLAND LOCOMOTIVE CLASSIFICATION

1913 Series

Nos.	Class	To Class	Nos.	Class	To Class
10-12	G-14		2nd 80-82	K-1	
14-17	G-34b		2nd 83-85	K-2	
18-23	G-34a		90-93	L-1	
24-25	G-34c		99	Pony	
26-31	G-34d		100-101	B-2-a	
32-37	H-6-a		102-104	B-9	
40	F-12	F-12a			
41	F-12		105	B-2-b	
42-43	F-12	F-12a	106	B-2-c	
44	F-12		107	B-3	
45	F-12	F-12a	109-110	U-3	
46-47	F-12		144-145	E-1-d	
48-49	F-12	F-12a	146-151	E-14	
50-57	F-11	F-11a	152-155	E-17	
58-60	F-15		793-794	C-25	
61-62	F-14		796	C-28	(NYC)
63-64	F-13		797	C-29	(NYC)
70-73	F-2-h	F-2-k	1000-1001	C-2	
74-79	F-2-j		1060,1063	C-X	(NYC)
1st 80-81	C-2		1880-1881	E-12	
1st 82-83	C-1		1892-1893	E-15	(NYC)
1st 84-85	C-1-a		1898-1899	E-16	(NYC)
86-89	C-1-b				

SUPERHEATERS

Engine Nos.	Installed	Engine Nos.	Installed
14	1-1926	50	4-1915
15	1-1925	51	8-1912
16	2-1924	52	9-1912
17	2-1919	53	1-1916
18	5-1915	54	10-1913
19	9-1915	55	10-1914
20	12-1914	56	4-1928
21	10-1914	57	5-1927
22	6-1917	70	8-1913
23	2-1918	71	6-1914
24 to 31	when built	72	2-2-20
32 to 37	when built	73	8-24-20
40	8-1919	74 to 79	when built
42	8-1918	1st 80	6-1916
43	4-1916	2nd 80 to 82	when built
45 (Cole)	4-1910	2nd 83 to 85	when built
48	7-1915	90 to 93	when built
49	7-1913	106 to 107	when built
		109 to 110	when built

The first superheater used was installed on No. 45. This was a Cole Superheater. All others were of the Schmidt type.

THE DIESEL LOCOMOTIVES

(As if anybody cared)

No.	Builder	C/N	Date	Type
200 -	ALCo-GE	78252	1950	1600 HP Road Switcher
201 -	ALCo-GE	78594	1951	1600 HP Road Switcher
202-204	ALCo-GE	78880-82	1951	1600 HP Road Switcher
205-208	ALCo-GE	80155-58	1952	1600 HP Road Switcher
400-401	ALCo-GE	79349-50	1951	1000 HP Road Switcher
402-405	ALCo-GE	79572-75	1951	1000 HP Road Switcher
500 -	G. E.	31175	1951	70 ton switcher

THE BENNINGTON & RUTLAND RAILWAY

The Western Vermont Railroad, which eventually became the Bennington & Rutland, was chartered November 5th, 1845. The first train was operated in May, 1852, and the road was opened to traffic in July, of that year. The road extended from Rutland to North Bennington, Vt., about 53 miles, and on the New York State line, at White Creek, N. Y., about 2 miles. A branch from North Bennington to Bennington, known as the Bennington Branch Railroad, was built about 1854, to the north side of Main Street, in Bennington. It was at this point that connection was later made with the Lebanon Springs R. R.

The Western Vermont operated under its own management until November 1st, 1857, at which time it encountered financial troubles and was taken possession of by the Mortgage Trustees, who leased it to the Troy & Boston R. R., under a lease which expired on January 15th, 1867, by which time it had become the Bennington & Rutland through re-organization. Connection was made with the Troy & Boston via the Troy & Bennington R. R., extending from the New York-Vermont line, at White Creek, to Hoosick Jct., on the main line of the Troy & Boston, about five miles distant, the Troy & Bennington being operated by the Troy & Boston. This was the only outlet of the Bennington & Rutland, at its southern end, and was of greatest importance to the existence of that road.

Since the B. & R. had purchased a number of locomotives in 1866, it is evident that the company did not anticipate renewal of the lease held by the Troy & Boston, and intended to operate it themselves or, what is more likely, to lease it to the Vermont Central, upon expiration of the T. & B. lease. It was, in fact, leased on January 16th, 1867, to Governor Smith and Hon. John H. Page, who without doubt represented the V. C.

It was at this point that violence and a long series of legal actions entered upon the scene, all of which are recorded in the Bennington

"Banner" throughout the year 1867. The accounts of the "indignation meetings" held in the various towns and of the special session of the state legislature bear witness to the intensity of feeling over the "railroad war." On January 16th, 1867, the B. & R. started suit against the Troy & Boston, claiming damages for breach of covenants in the lease to keep the road in repair. Concurrently with filing of the suit, the B. & R. attached three locomotives and a number of cars, property of the T. & B., at North Bennington. Keepers were placed on each of the locomotives and a switch "was so adjusted that the locomotives could not be moved without moving off the track, and was padlocked. About two hours later, a large number of Irishmen, directed by one Wellington, a roadmaster for the T. & B., forced the men away from the switch and unlocked it. A number more, with engineers, jumped upon two of the locomotives and started for the state line, holding the keepers by force until they crossed the state line. They also took one passenger and one baggage car."

The same day, another engine and two cars were attached, in Pownal, Vt., and placed in charge of keepers. About daylight the next morning, an engine was sent up from Eagle Bridge and by force took this property into New York State, also taking the keepers with them. In both cases the keepers were released unharmed, after crossing the state line.

Although there appears to be some question as to the method employed by the B. & R., it also appears that they acted legally and, further, that almost any steps were justified in dealing with a company having the reputation then enjoyed (?) by the T. & B. Newspaper accounts indicate that an agent of the T. & B., living in Bennington, arranged to have the T. & B. equipment in North Bennington, where it could be seized.

In retaliation, the T. & B., on the day the Managers took possession of the road, gave notice that in the future they would not operate the Troy & Bennington, from Hoosick Jct. to the state line, thus most effectively shutting off all transportation south and west of Bennington. The account further states that about a year prior to this time the T. & B. had entered into a contract with the Rensselaer & Saratoga to divert all their business between Troy and Rutland, both passenger and freight, from the B. & R. and send it over the New York State line, by-passing the entire B. & R. The T. & B., probably anticipating that the lease of the B. & R. would not be renewed, took this step to deprive that road of the traffic and force a new lease from the B. & R., or perhaps, the purchase of the road itself.

In February, 1867, the T. & B. was reported to have leased one-half of its road from Hoosick Jct. to the state line to the R. & S., for a ten-year term, and further articles attack that road for its "monopolistic" development.

All attempts at negotiation between the B. & R. and its lessees with the T. & B. were at first ignored and later definitely rejected. The loss of the Vermont market was keenly felt by the merchants of

Troy, and the feeling in that city against the T. & B. was almost as great as in Bennington and southwestern Vermont.

Desperate and faced with being forced out of existence, the B. & R. sought a southern connection and the only solution seemed to be the completion of the Lebanon Springs road, which would provide a line to Chatham, N. Y., to connect there with the New York & Harlem and the Boston & Albany. The Lebanon Springs had been partly completed, but was at a standstill because of lack of funds. Financed by Bennington capital, it was rushed to completion and was ready for traffic in 1869. It was leased to the B. & R., that year, and, in February, 1870, the two roads were consolidated as the Harlem Extension Railroad.

In the meantime, in 1868, the T. & B., aware of the progress in completing the Lebanon Springs R. R. and realizing that nothing was to be gained by its continued blocking of the B. & R., resumed operation of the Troy & Bennington road and its traffic relations with the B. & R. However, the opening of the L. S. R. R. was far more important to the B. & R. than the resumption of traffic relations with the T. & B., a much greater proportion of later-day freight traffic passing over the Chatham Branch.

On December 18th, 1872, the Harlem Extension R. R., was leased to the newly formed and short-lived New York, Boston & Montreal R. R., by which it was operated for a short time during 1872 and 1873. This lease was transferred to the Central Vermont, on December 1st, 1873, and was cancelled by that road, in 1877, after which, the section in Vermont was operated by the re-organized B. & R. Ry., until its capital stock was taken over by the Rutland R. R., in February, 1900.

The further checkered career of that section of the Harlem Extension, partly in Vermont, but mostly in New York, is noted in the account of the Lebanon Springs R. R. and its successor, the C. & L. V.

THE LOCOMOTIVES

The history of the earliest motive power of the B. & R. begins with a group of eight engines built for the Western Vermont R. R., predecessor of the Bennington & Rutland. Of these, seven came from Hinkley, in the years 1851-2-3, and one from the Lowell Machine Shop, in 1854. There is some question as to whether all of these were delivered to the W. V., and it is possible that the "Danby" became the "Cayuga," on the New York & Harlem, although the New York State Report of 1856 shows the latter as having 15″x18″ cylinders, while the "Danby's" were 16″x20″.

Eliminating this one engine leaves seven, which, by coincidence, is the number of Troy & Boston engines said to have been seized by the B. & R., at the time that the lease of the W. V. to the T. & B. was abandoned. The final disposition of the original seven W. V. engines is unknown. However, if these engines were allowed to deteriorate, while in possession of the T. & B., as claimed by the B. & R. in their suit against that company, it may readily be assumed that, after thirteen

to sixteen years of service and neglect, they were unfit for anything other than scrapping.

The following roster of the B. & R. is believed to be fairly accurate, but it is possible that there may have been more changes in the names of the locomotives than are recorded here. There are at this time (1950) men who remember the B. & R. engines, but it is difficult to get them to agree, in all respects, as to the names on them. Mr. George McMaster, of Rutland, who worked for the B. & R. and the Rutland, from June 26th, 1882, until 1938, has been the most reliable source of information, and the roster was made up partly from his recollections.

Much of the motive power on the Lebanon Springs R. R. was supplied by the B. & R., which had leased that road, prior to its opening in the middle of 1869. The first excursion train on the L. S. R. R. was run from Bennington to New Lebanon, on July 21st, 1869, and was pulled by the new B. & R. engine, "Mountain Girl." The B. & R. also furnished locomotives to move freight up and down the Bennington & Glastenbury R. R., after that road had been electrified for passenger service only.

An item of interest, which may or may not be generally known, was brought out in the compilation of the data on the B. & R. locomotives. Photographs of second No. 7 and of No. 10 showed engines bearing the well known Rogers characteristics, but with "Brooks" on the steam chest casing. Inquiry brought forth the following explanation from your Editor.

"Horatio G. Brooks, founder of the Brooks Works, left the employ of the Erie to start the locomotive building company bearing his name. He had run, worked on and with Rogers engines, and he admired them. His first locomotives followed very closely their pattern, even to the fluted steam and sand dome (coffee pot, some call them) castings. In addition to the name being stamped on the steam chests, you can always tell them because the sand domes were not as high as the Rogers, but a hasty glance would lead one to believe that they might be Rogers engines. Later, Brooks introduced his smoother outlined castings and his unmistakable cabs, but his first engines are frequently confused with those of Rogers."

LOCOMOTIVES OF THE WESTERN VERMONT R. R.

All 4-4-0 Type

Name	Builder	Date	C/N	Cyls.	DD
Martin E. Denny	Hinkley	11- 4-1851	339	14x20	66
Wallingford	Hinkley	12-29-1851	350	16x20	60
Bennington	Hinkley	6-21-1852	377	14x20	66
Danby	Hinkley	8-28-1852	393	16x20	60
Manchester	Hinkley	10-16-1852	405	14x20	66
Shaftsbury	Hinkley	1-10-1853	420	16x20	54
No name	Hinkley	1-21-1853	421	16x20	54
Falcon	Lowell M.S.	1854		14x20	66

Exhaust steam injector on Rutland #90.

Rutland #105, at Bellows Falls, Vt. Ex-450. Manchester #53286, 1913.

Rutland #110. U. S. R. A. Standard 0-8-0. Pittsburgh #60159, 1918.

Rutland #147. Ex-1887-387-240. Schenectady, #5010 1898. Engineer's name, "W. H. Murray," on the cab.

Rutland #794. Ex-171. Ex-B. & R. #12. Schenectady #1919, 1884.

BENNINGTON & RUTLAND RAILWAY

No.	Name	Builder	C/N	Date	Type	Cyls.	DD	Remarks
1	Hiland Hall	Mason	241	1866	4-4-0	15x22	66	
2	Luther Park	Baldwin	1520	1866	4-4-0	14x20	60	Sc. 1894
3	A. L. Miner	Baldwin	1527	1866	4-4-0	14x20	60	
3		Rogers	1910	1871	4-4-0	15x22	54	
4	C. G. Lincoln	Baldwin	1529	1866	4-4-0	14x20	60	
5	Lebanon	NRR (NH)		1862	4-4-0	14x24	60	
5	Trenor W. Park	Schenect.	3351	1891	2-6-0	18x24	55	To Rut. 380-1880
6	Manchester	Rogers	765	1857	4-4-0	14x20	66	
6	H. P. McCullough	Schenect.	3352	1891	2-6-0	18x24	55	To Rut. 381-1881
7	G. F. Carman	Rogers	166	1849	4-4-0	14x20	66	
7	M. S. Colburn	Brooks	189	1873	4-4-0	16x24	60	From #11
8	Mountain Boy	Schenect.	563	1869	4-4-0	16x24	66	To Rut. 60-1060
9	Mountain Girl	Schenect.	564	1869	4-4-0	16x24	66	To Rut. 61-1061
10	C. E. Houghton	Brooks	185	1873	4-4-0	16x24	60	
11	M. S. Colburn	Brooks	189	1873	4-4-0	16x24	60	Ren'd #7
11	M. S. Colburn	Schenect.	1918	1884	4-4-0	17x24	63	To Rut. 170-793
12	Trenor L. Park	Schenect.	1919	1884	4-4-0	17x24	63	To Rut. 171-794
13	No engine							
14	J. G. McCullough	Schenect.	4199	1894	4-4-0	18x24	64	To Rut. 180-864-84
15	F. B. Jennings	Schenect.	4200	1894	4-4-0	18x24	64	To Rut. 181-865-85
16	Not named	Brooks	3348	1900	4-4-0	18½x26	68	Received as Rut. #244

ROSTER NOTES

2nd 3. Ex. S. L. & N. No. 3. Purchased from Bennington & Glastenbury R. R., about 1889. Destroyed in wreck, at South Shaftsbury, 1-15-1894.

1st 5. Ex. "James Sedgley," L. I. R. R. Received August 1869.

1st 6. Ex. "Pacific," L. I. R. R. Received August 1869.

1st 7. Ex. "Albany" No. 27, N. Y. & Harlem; Sold by NY&H to L. I. R. R. and renamed "G. F. Carman." Received August 1869.

2nd 7. Reb. Taunton 5/1882. Later renamed "H. W. Spafford."

8. Renamed "Frank C. White." Renamed "E. D. Bennett."

9. Renamed "C. J. McMaster."

10. Ex. N. Y. B. & M. No. 1.

1st. 11. Ex. N. Y. B. & M. No. 3.

14. Sold to Ft. Smith & Western No. 6, October, 1920.

15. Sold to Ft. Smith & Western No. 5, October, 1920.

16. Sold, 1902, to C. P. R. Nos. 181-299-199.

LEBANON SPRINGS RAILROAD

The Lebanon Springs Railroad was one of the two railroads in southwestern Vermont, which played an important part in the development of the Rutland to the south, and whose record of participation in various railroad combinations and ownerships greatly exceeds that generally found in a road of its size, and whose history is far more complicated than the following outline indicates. Its forerunner, the New York & Bennington R. R., was incorporated on October 13th, 1851, to build and operate a railroad between the northern terminus

of the New York & Harlem R. R., at Chatham, N. Y., and the New York-Vermont state line (51 miles), there to connect with the Vermont & New York R. R., extending to Bennington, Vt., a distance of 6 miles. The N. Y. & B. was purchased on November 3rd, 1852, by the Lebanon Springs R. R., which had been organized on March 28th, 1852. The L. S. R. R. and the V. & N. Y. were consolidated by agreement dated August 20th, 1867.

Although parts of the line had been built earlier, lack of funds had delayed its completion until interest in the road was revived in 1867 when, upon termination of the lease of the Western Vermont (the W. V. had become the Bennington & Rutland, through reorganization on August 1st, 1865) to the Troy & Boston, the former line was left without a southern outlet and was effectively bottled up at its southern terminus, in Bennington.

Due to the urgency of having a new outlet to the south and west, the B. & R., or those interested in it, furnished financial aid to rush the Lebanon Springs line to completion in 1869, at which time it was leased to the B. & R. On January 1st, 1870, both roads were consolidated under the name of Harlem Extension R. R., and this newly formed road was leased to the New York, Boston & Montreal Railway, on December 18th, 1872, the lease being transferred to the New York, Boston & Montreal Railroad Co., on January 21st, 1873. This company planned a new route from New York to Montreal, using the projected New York & Boston, the existing Dutchess & Columbia, and the projected Pine Plains & Albany, along with the Harlem Extension. (Baker) The N. Y. B. & M. RY. Co., formed in 1872, had acquired lease of the Harlem Extension and had consolidated with the N. Y. Boston & Northern to form the N. Y. B. & M. R. R. Co., incorporated January 21st, 1873.

The lease of the Harlem Extension was transferred to the Central Vermont on December 1st, 1873, and was abandoned on August 20th, 1877, the properties reverting to the original owners, the section in Vermont, except from Bennington to the N. Y. line, passing to the Bennington & Rutland. The C. V. continued to operate the remainder of the road, Bennington to Chatham, until September 16th, 1877, on which date the lease was abandoned and operations taken over by the Harlem Extension South Coal Transportation Co., pursuant to lease dated November 27th, 1877. This section was sold under foreclosure, purchased by the bondholders, who received title by deed dated August 29th, 1885, and who re-conveyed title to the New York, Rutland & Montreal Ry. Co., on October 23rd, 1885. The N. Y. R. & M. Co. had been chartered on December 31st, 1883, for the purpose of consolidating the Lebanon Springs with the B. & R., a union which never took place.

By order of the New York Board of Railroad Commissioners, the operation of the road in New York State was discontinued on July 30th, 1896, due to its unsafe condition. Repairs were completed by December 13th, 1897, and traffic was resumed between Berlin and Petersburg Jct., where the line crosses the Boston & Maine. In the meantime, the N. Y. R. & M. Co had been reorganized as the Lebanon

Springs R. R. Co., incorporated on June 9th, 1893, this being the second corporation to use this name.

The part of the road located wholly in New York, from Chatham to the Vermont State Line, was sold under foreclosure on August 12th, 1899, by deed dated September 20th, 1899, and title was reconveyed, by deed of Sept. 23rd, 1899, to the Chatham & Lebanon Valley R. R. Co., which was incorporated on that date. The part from the state line to Bennington was sold under foreclosure and title was conveyed by deed of June 25th, 1900, and reconveyed to the Rutland Railroad Company, on September 18th, 1901.

The Chatham & Lebanon Valley was leased to the Rutland on March 1st, 1900, and was sold to the Rutland on June 13th, 1901, consolidation taking place on December 21st, of that year.

The route of the road lies in eastern New York State, chiefly in farming country of rolling topography, the cause of many curves and undulating grades. Of the latter, probably the worst was that immeddiately south of the Bennington station, where the ever-curving track rose about 175 feet in the less than three miles to Gypsy Lane Crossing. This part of the line was known locally as the "corkscrew," for, in the eight miles between Bennington and Beehive Crossing, it crossed the main highway five times. Thus, in driving at a moderate speed, it was possible to witness the passing of a single train five times, in travelling the highway west of Bennington. The northbound grade, from Petersburg Jct. to the summit at the Anthony Crossing, was more or less constant, and the tracks rise about 380 feet in the 7.4 miles, but maximum grades were greater than indicated by these figures, necessitating double-heading many of the trains in both directions.

There were a number of conditions which made this branch expensive to operate. There was the perpetual threat of floods and wash-outs in the vicinity of Petersburg Jct. The excessive grades, coupled with the fact that the line became merely a "bridge" line upon which little freight originated or terminated, brought about the decision by the hard-pressed Rutland to apply for permission to abandon the entire line from Bennington to Chatham, and to route its freight trains over its own tracks to White Creek, N. Y., thence to Troy, via trackage rights over the Boston & Maine, and to Rensselaer and Chatham, via trackage rights over the N. Y. C. Lines. Passenger train service had been discontinued over this part of the road on June 25th, 1932, although passengers were carried on a "mixed" train until April 1st, 1938.

Accordingly, announcement was made on February 7th, 1952, that the Rutland had filed an application with the Interstate Commerce Commission to abandon the Chatham Branch. In the February 29th issue of the Bennington *Banner* appeared a notice by the Rutland Railway Corporation, saying that the said application had been filed on February 11th, to abandon the road and to acquire the aforementioned trackage rights over "the lines of the Boston & Maine R. R., Troy Union Railroad Co., and the New York Central Railroad Co., from White Creek through Troy to Chatham, N. Y."

On June 26th, 1952, the I. C. C. opened public hearings on the Rutland petition, and the *Banner* of September 23rd, 1952 announced that abandonment was expected following the I. C. C. examiner's recommendation that the railroad be allowed to re-route freight traffic in the State of New York.

There was some further delay due to opposition of residents of some of the towns along the line, Berlin, Stephentown and New Lebanon, but permission was finally granted by the State of New York, and, in March, 1953, the Rutland advertised for bids for removal of the track, scheduled to be completed by June 1st, 1954. The project called for the removal of more than 8500 tons of rail, 19 bridges weighing 1004 tons, and 85-foot turntable at Chatham, and 316 tons of spikes, bolts and other equipment.

An April 21st, 1953, announcement was made that the Chatham Division would be abandoned on May 20th, 1953, an embargo having been issued on all freight destined for delivery at stations between Bennington and Chatham that "cannot be reached by May 20th."

Contract for dismantling the line was given to the Commercial Construction Company, of Dallas, Texas, the work to be started on June 1st, 1953, and to be completed within four months from that date, starting at Chatham, N. Y. and working back to Bennington. Some of the best rails and track material were retained by the Rutland, and the balance sold by them as scrap.

The last scheduled train over this branch was run on May 20th, 1953, drawn by engine No. 403 (Rutland to Chatham and return), in charge of Engineer H. J. Lethbridge and Conductor R. H. Brown, accompanied by Trainmaster Ed Harrison. The train returned from Chatham bringing all records and equipment from the stations along the line. Actually, however, the last revenue train was an extra handling some high clearance cars that would not clear the State Street tunnel in Troy.

The first train to operate over the new route was No. 88, a milk train pulled by engine No. 206, on the night of May 20th, and was in charge of Supt. William Lovett and Road Foreman of Engines P. J. Slattery.

On Tuesday, May 12th, in preparation for the change-over, an extra train, consisting of engine No. 206, coach No. 723, and business car No. 99, and carrying about thirty crew members and five officials, was run from Rutland to Chatham, and then back to Troy, making stops en route for the purpose of inspecting interlocking plants and "time limit" switches. The train was then operated back to Chatham, returning to Albany, where a meeting was held in the office of the Rules Examiner in the Albany Union Station, after which, the train returned to Rutland, completing a long and strenuous day of "qualifying."

On May 13th, engine No. 74, the last steam switcher in Bennington, was sent to Rutland to await disposition, but to be kept temporarily for possible use by the contractors in tearing up the Chatham line. First work on the dismantling was done in May, and the trains of salvaged materials were handled by Rutland diesels and crews. Late in June,

the Rutland was completely tied up by a strike, the first in its long history, and the trains were then handled by a Whitcomb diesel No. 53, owned by the contractors, and which had much difficulty in pulling more than three cars over the rugged hills of Vermont. After nineteen days, on July 15th, the strike was settled, and operations, except passenger train service, were resumed. Work of tearing up the tracks continued during the strike. Rails were moved in gondolas, while other materials, such as ties, splice-bars, etc., were moved in trucks belonging to the contractor, and were unloaded at Bennington.

By July 30th, track had been removed as far north as Petersburg Jct., where the line crossed the B. & M. tracks, and B. & M. crews removed the crossing frogs and signal controlling the crossing. Beehive Crossing, N. Y., was reached by the wrecking crew on August 3rd, and Anthony Crossing, Vt., on August 5th. Late in the afternoon of August 7th, the last rail was taken up about one hundred feet north of the West Main Street crossing, in Bennington. There ended the career of the Lebanon Springs R. R. and its countless mergers, consolidations, and re-organizations, a railroad which Commodore Vanderbilt had predicted would not last a hundred years, when he was approached for aid for the road, when it was being financed in its earliest years.

The salvaged ties and the bridges, the latter having been cut up into portable sections with oxy-actylene burners, were transported by truck to Bennington. for further disposition, the work of dismantling being completed in November, 1953.

THE LOCOMOTIVES

A rather thorough search failed to locate or even suspect the existence of any official records of the locomotives of the L. S. and C. & L. V. Railroads. What data are available are for the most part from recollections and from records of other roads, whose motive power eventually found its way to the Lebanon Valley lines. With the exception of the two eight-wheelers received from Baldwin in 1890, every one of the engines of these companies had seen service on one or more other roads. There are also indications that locomotives were leased from time to time, probably from the N. Y. C. & H. R. and the B. & R. Records of the Rome Locomotive Works show that, on January 6th, 1886, Lackawanna & Pittsburg No. 208 was delivered to the L. S. R. R. for trial, but was not accepted and was returned. It was subsequently sold to the New York, Rutland & Montreal, together with L. & P. No. 210. Since the N. Y. R. & M. was one of the operators of the Lebanon Springs road (1885 to 1888), it is possible that these engines were used on that road, although they do not appear in the appended rosters, and their ultimate disposition is not known.

Apparently none of the L. S. engines bore names, which is unusual, in view of the period in which the railroad operated. From what material is available, it appears that there were two renumberings of the locomotives, the scheme of the first one being something to wonder about, where No. 1 become No. 12, No. 3 was changed to No. 233, No. 4

to 69, and No. 5 remained unchanged. The date of this renumbering is not certain, but it was probably about 1890, and was done primarily to make room for new Nos. 1 and 2, received that year. Later on the 1890's, Nos. 1 and 2 were changed to Nos. 6 and 9 respectively, and No. 233 was changed back to No. 3. An interesting story is told about the former change and accounts for the absence of numbers 7 and 8 on the final C. & L. V. roster.

These engines, Nos. 1 and 2, were scheduled to be renumbered to Nos. 6 and 7, when some one located a brass plate bearing the number "66" cast thereon. This plate was cut in half and one "6" was placed on the number plate of No. 1. The other "6" was inverted, becoming "9," and was placed on the No. 2. Hence, Nos. 1 and 2 became Nos. 6 and 9, and the use of numbers 7 and 8 was by-passed. It would appear that this masterpiece of economy took place in Vermont, rather than in New York!

After the C. & L. V. took over the Lebanon Springs road, it purchased two second hand locomotives, viz., the No. 4, an 0-6-0 (often erroneously identified as a former Lehigh Valley engine), and the No. 5, a 4-4-0, the latter purchased from the Rhode Island Locomotive Works.

Only four engines from the C. & L. V. went to the Rutland, viz., Nos. 3, 5, 6 and 9. The No. 9 became Rutland No. 175 and, later, No. 798. It was while carrying this number that she was in a collision with Rutland No. 2044, pulling a south-bound milk train, near the Soldiers' Home Crossing, in Bennington, on September 7th, 1912. The No. 798 was so badly damaged that she was never repaired.

An account of the Lebanon Springs locomotives, in the Central Vermont Bulletin, of the R. & L. H. Society, states that, according to Mr. George J. McMaster, Master Mechanic on the old Bennington & Rutland Railway, the Lebanon Springs started out with three second-hand locomotives—the "Chazy," "Mad Tom" and "King Phillip." The first came from the O. & L. C., by way of the Rutland & Burlington; the second may have been the "Romulus," Norris, 1839, on the Seaboard & Roanoke, purchased from the U. S. Military R. R., and the "King Phillip" was probably the engine of the same name from the Boston & Providence R. R., Locks & Canals, 1839. These locomotives were all scrapped at Rutland, Vt., during the early seventies. This being the case, and records indicating that the next engine purchased was from the D. & H., in 1878, it would seem that the road's operations were carried on, during this period, with leased power.

The other known locomotives appear in the following rosters.

Lebanon Springs Railroad Locomotives, to 1890

No.	Ren'd	Builder	C/N	Date	Type	Cyls.	DD	Rec'd
1	12	Taunton	162	1855	4-4-0	16x22	54	1878
2		R. K. & G.	303	1852	4-4-0	14x20	54	10-1880
3	233	D. C. & Co.		1854	4-4-0	15x20	60	10-1880
4	69	Br. & Kn'd		1859	4-4-0	15x20	60	5-1881
5	5	Br. & Kn'd		1857	4-4-0			5-1881

1. Built for the Rutland & Washington R. R., named "Chamberlain." Renamed "Merrit Clark," prior to 1867. Became D. & H. #114. To L. S. in 1878.
2. Built as New York & Harlem #10, "Troy."
3. Built as New York & Harlem #11, "George L. Schuyler."
4. Built as New York & Harlem 2nd #3, "United States."
5. Built as New York & Harlem #23, "Island Belle."

1890-1899

1		Baldwin	10841	1890	4-4 0	17x24	63	Ren. C&LV #6.
2		Baldwin	10849	1890	4-4-0	17x24	63	Ren. C&LV #9.
5	(x-5)	Br. & Kn'd		1857	4-4-0			Scrapped 1897.
12	(x-1)	Taunton	162	1855	4-4-0	16x22	54	Scrapped 1897.
69	(x-4)	Br. & Kn'd		1859	4-4-0	15x20	60	Scrapped 1897.
233	(x-3)	D. C. & Co.		1854	4-4-0	15x20	60	Ren. C&LV #3.

CHATHAM & LEBANON VALLEY R. R.

3	D. C. & Co.		1854	4-4-0	15x20	60	To Rutland	#77
4	?		?	0-6-0	15x20	60		
5	Brooks	910	1883	4-4-0	14x22	56	To Rutland	#78
6	Baldwin	10841	1890	4-4-0	17x24	63	To Rutland	#174-797
9	Baldwin	10849	1890	4-4-0	17x24	63	To Rutland	#175-798

No. 5 was ex-Narragansett Pier #3, bought from R. I. Locomotive Works.

Because a number of engines from the A. & St. L. and the St. L. & A. railroads eventually reached the Rutland, mention should be made of these roads in connection with Rutland motive power.

The Herkimer, Newport & Poland R. R., forming the southern end of the A. & St. L., was chartered on June 29, 1880, and opened to traffic in 1881-2. Its gauge was 42", and the line extended from Herkimer, east of Utica on the Mohawk River, in a northwesterly direction to Poland, N. Y. In 1892 the track gauge was changed to standard. At about this time, the N. H. & P. was continued to Remsen, 11 miles, through construction of the H. N. & P. Extension R. R.

In 1891-2, the A. & St. L. was built from the Remsen terminus to Malone, N. Y., and became part of the Mohawk & Malone R. R., by consolidation, in 1893, the M. & M. being a consolidation of the above three lines. The M. & M. was leased to the N. Y. C. & H. R., and was operated as part of that road's Mohawk Division. During its existence, the A. & St. L. had forty or more locomotives, on the tenders of which was lettered the road's name, and was painted the road's symbol, a "fleur-de-lis." Many of these locomotives were acquired by the Central Vermont, which assigned at least five of them to the Rutland Division, so-called, then under lease to the C. V.

For some time after the formation of the M. & M., tenders were lettered Adirondack & St. Lawrence *Line*, by which name the road was known. First Nos. 1, 2 and 3 of the A. & St. L. were originally the narrow gauge engines of the H. N. & P., which were rebuilt to standard gauge, and later Nos. 1 and 3 became C. V. Nos. 9 and 12.

In order to complete a rail route from Malone to Montreal, the Malone & St. Lawrence R. R. was built from Malone to the Canadian

Line, where it connected with the St. Lawrence & Adirondack R. R., extending from there to Valleyfield, P. Q., and which was completed on January 11th, 1892. Dr. W. S. Webb acquired this line in June, 1892, and turned it over to the Central Vermont for operation, for a few years. Connection was made at Valleyfield to Ottawa, and, at Coteau, to Montreal via the Grand Trunk.

The line was returned to Dr. Webb, who (1) leased part of the Grand Trunk line from Valleyfield to Beauharnois, (2) built the Southwestern R. R. (chartered in Canada on Sept. 10th, 1891) from Beauharnois to Caughnawaga Jct. (now Adirondack Jct.), and (3) obtained trackage rights from there to Montreal, nine miles, over the Canadian Pacific. The St. L. & A., the M. & St. L., and the Southwestern Railroads were consolidated in 1896, to form a new St. L. & A., which was leased to the N. Y. C. & H. R. R. R. from June 1st, 1898, to January 1st, 1905, when the N. Y. C. bought all of the stock of the St. L. & A.

The St. L. & A. owned at least 30 locomotives, of which eight were acquired by the Rutland, and the others by the New York Central. Tenders of some of the engines were lettered with the road's full name, but, in later years, the single word "Adirondack" was painted instead.

To add to the confusion caused by the similarity of names of these two roads, there was another road bearing the name Adirondack & St. Lawrence. This was a short line (3.61 miles) in western New York, extending from Hermon village to DeKalb Jct., on the New York Central, and on which operations were suspended on February 12th, 1921. This road had three locomotives at the time of abandonment.

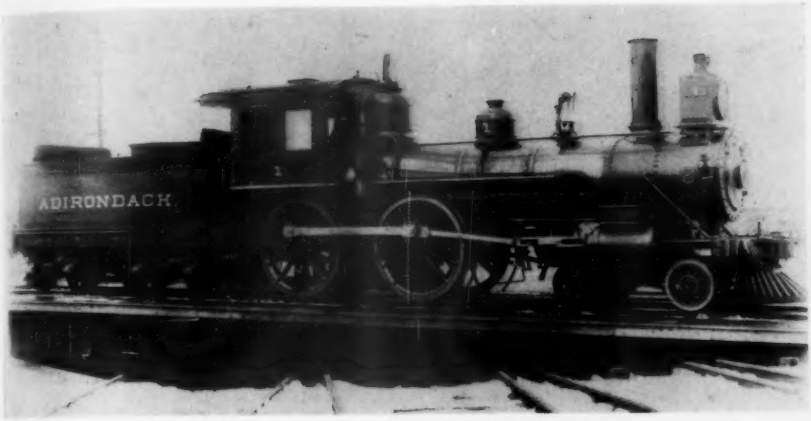
THE LOCOMOTIVES OF THE ADIRONDACK & ST. LAWRENCE R. R.

No.	Builder	C/N	Date	Type	Cyls.	DD	Date	Disposition To
1	Baldwin	5627	1881	4-4-0	10x16	42		ex-HN&P 1. To CV 9. Sc. 1899 "Edward W. Burnes"
2	Mason		1874	2-4-4T	12x16	36		ex-HN&P 2; ex-New Brunswick Ry. "Henry W. Dexter"
3	Baldwin	4286	1878	2-6-0	14x18	42		ex-HN&P 3; ex-Georgia Land & Lbr. Co. "J. C. Anderson". To CV 12-4
1	Schenectady	3510	1891	0-4-0	16x24	51	1891	CV 211; Rut 80; NCYL 50; Rut 50
2	Schenectady	3515	1891	0-4-0	16x24	51	1891	CV 20-49
4	Rh. Island	710	1878	2-4-4	11x16	42		ex-N. Y. Elevated Ry. 45. To 99
6	Schenectady	828	1872	4-4-0	16x24	63		ex-NYC 224; ex-361; To CV 13-42
7	No data						1897	Scrapped W. Albany
11	Schenectady	3511	1891	4-4-0	18x24	69	1891	CV 232; Rut 182; NYCL 862; Rut 82-67
11	Schenectady	3593	1892	4-4-0	17x24	63	1892	CV 30-50
12	Schenectady	3512	1891	4-4-0	18x24	69	1891	CV 233; Rut 183; NYCL 863; Rut 83
12	Schenectady	3594	1892	4-4-0	17x24	63	1892	CV 31-51
13	Schenectady	3513	1891	4-4-0	18x24	69	1891	CV 107-102
14	Schenectady	3514	1891	4-4-0	18x24	69	1891	CV 108-103
15	Schenectady	3754	1892	4-6-0	20/30x26	70		NYC 993-2025
16	Schenectady	3755	1892	4-6-0	20/30x26	70		NYC 994-2026

(Wills T. White, Photo.)

Bennington & Rutland #1, "Hiland Hall." Mason #241, 1866. As rebuilt about 1900.

Bennington & Rutland Second #7, "M. S. Colburn." Brooks #189, 1873.



St. L. & A. Third #1. Ex-CV 170; ex-NLN 20. To Rutland 238-79.

Rutland Caboose #31. Conductor Wm. P. Keefe, at Bennington, Vt. May 9th, 1952.

17	Schenectady	3825	1892	4-6-0	20/30x26	70		NYC 995-2027
30	Schenectady	3706	1892	4-6-0	19x24	62	2/94	LV 707-1125
31	Schenectady	3506	1891	4-6-0	18x24	56	1892	CV 234; Rut 480; NYCL 2061; Rut 61
31	Schenectady	3707	1892	4-6-0	19x24	64	2/94	LV 706-1124
32	Schenectady	3505	1891	4-6-0	18x24	56	1892	CV 235; Rut 481; NYCL 2062; Rut 62
32	Schenectady	3722	1892	4-6-0	19x24	63	1892	CV 116-209
33	Schenectady	3723	1892	4-6-0	19x24	63	1892	CV 117-210
34	Rh. Island	2730	1892	4-6-0	19x24	56		Ren. 113. 1892, to CV 113-206
35	Rh. Island	2727	1892	4-6-0	19x24	56		Ren. 114. 1892, to CV 114-207
38	Rh. Island	2726	1892	4-6-0	19x24	56		Ren. 112. 1892, to CV 112-205
39	Rh. Island	2762	1892	4-6-0	19x24	56		Ren. 115. 1892, to CV 115-208
50	Schenectady	3686	1892	2-6-0	20/30x26	57		NYC 842-1813
51	Schenectady	3687	1892	2-6-0	20/30x26	57		NYC 843-1814
52	Schenectady	3826	1892	2-6-0	20/30x26	57		NYC 844-1815
60	Schenectady	4055	1893	2-8-0	22/33x26	51		NYC 996-2210
61	Schenectady	4056	1893	2-8-0	22/32x26	51		NYC 997-2211
80	Schenectady	3879	1892	4-6-0	19/28x24	69		NYC 998-2186
81	Schenectady	3880	1892	4-6-0	19/28x24	69		NYC 1000-2187
82	Schenectady	3883	1892	4-6-0	19/28x24	69		NYC 1001-2188
83	Schenectady	3884	1892	4-6-0	19/28x24	69		NYC 1002-2189
84	Schenectady	3885	1892	4-6-0	19/28x24	69		NYC 1003-2190
99	Schenectady	3639	1892	2-4-6	16x22	61		"St. Lawrence" To CV 109
99	Rh. Island	710	1878	2-4-4	11x16	42		From #4. Inspection engine
101	Schenectady	3878	1892	4-4-0	19x24	69	1892	CV 129-106
110	Rh. Island	2760	1892	4-6-0	19x24	56	1892	CV 110-203
111	Rh. Island	2761	1892	4-6-0	19x24	56	1892	CV 111-204
112	Rh. Island	2726	1892	4-6-0	19x24	56	1892	From. 38. To CV 112-205
113	Rh. Island	2730	1892	4-6-0	19x24	56	1892	From 34. To CV 113-206
114	Rh. Island	2727	1892	4-6-0	19x24	56	1892	From 35. To CV 114-207
115	Rh. Island	2762	1892	4-6-0	19x24	56	1892	From 39. To CV 115-208
116	Schenectady	4114	1893	2-6-0	19x26	57	1893	CV 130-336
117	Schenectady	4115	1893	2-6-0	19x26	57	1893	CV 131-337
118	Schenectady	4116	1893	2-6-0	19x26	57	1893	CV 132-338
119	Schenectady	4117	1893	2-6-0	19x26	57	1893	CV 133-339
120	Schenectady	4118	1893	2-6-0	19x26	57	1893	CV 134-340
—	Schenectady	4144	1893	4-4-0	18x24	74	11/93	Sold to C. R. R. of Pa. #6. Named "Ne-Ha-Sa-Ne." No A&StL number.

Note: #99. Schenectady #3639, was sold to the Central Vermont, where it was rebuilt to a 4-4-0, an inspection engine, retaining its name "St. Lawrence."
#99. Rhode Island #710, was rebuilt from a former N. Y. Elevated Railway locomotive.
The above record, showing Schenectady Nos. 3706 and 3707 as going to L. V. Nos. 707 and 706, respectively, concurs with the L. V. records. Schenectady records show that Nos. 3706 and 3707 became L. V. Nos. 706 and 707, respectively.
Nos. 116 through 120 were probably ordered by the A. & St. L., but were probably delivered to the C. V., without ever seeing service on the A. & St. L.

LOCOMOTIVES OF THE ST. LAWRENCE & ADIRONDACK R. R.

(Names shown at end of roster)

No.	Builder	C/N	Date	Type	Cyls.	DD	Date	Disposition To
1	Schenectady	4130	1893	2-6-0	19x26	57		NYC 784-1687
1	Schenectady	4437	1896	4-4-0	18x24	67	1897	CAR 24-628; GTR 1331-2240; CN 311
1	Manchester	445	1872	4-4-0	15x22	66	1898	ex-CV 170; ex-NLN 20. To Rut 238-79

1	Schenectady	1655	1882	4-4-0	17x24	64		From #11; ex-NYC 452, ex-256. Received 12-1898
2	Schenectady	4393	1895	2-6-0	19x26	64		NYC 785-1688
2	Brooks	2677	1896	4-6-0	20x26	57		Ren'd 4
2	Schenectady	4438	1896	4-4-0	20x24	67		CCC&StL 203; NYCL 7143
2	Schenectady	2221	1886	4-4-0	17x24	64		From #12; ex-NYC 494, ex-267, ex-489, ex-276. Rec'd 4-1900
3	Brooks	2678	1896	4-6-0	20x26	57		NYC 2028
3	Schenectady	4394	1895	4-4-0	20x24	73		From #13; to CCC&StL 202; NYCL 7142
3	Schenectady	5591	1900	2-6-0	20x28	57	1900	Rut 320; NYCL 1884; Rut 144
4	Schenectady	4439	1896	4-6-0	20x26	57	1896	MC 452-8180
4	Brooks	2677	1896	4-6-0	20x26	57		From #2; To NYCL 2029
4	Schenectady	5592	1900	2-6-0	20x28	57	1900	Rut 321; NYCL 1885; Rut 145
5	Schenectady	4334	1895	4-6-0	20x26	64	1896	MC 453-8181
5	Brooks	2772	1897	4-4-0	18x26	64	1900	Rut 249-190; NYCL 1000; Rut 80-65
6	Brooks	2668	1896	4-6-0	18x26	69	1896	LS&MS 602-544-5019
6	Brooks	2773	1897	4-4-0	18x26	64		NYCL 1002 (1903-4)
7	Brooks	2669	1896	4-6-0	18x26	69	1896	LS&MS 603-545-5017
7	Brooks	2774	1897	4-4-0	18x26	64	1900	Rut 250-191; NYCL 1001; Rut 81-66
8	Brooks	2670	1896	4-6-0	18x26	69	1896	LS&MS 604-546-5018
8	Schenectady	4932	1898	4-6-0	20x28	61	1900	Rut 251-420; NYCL 2153-2063; Rut 63
9	Schenectady	4933	1898	4-6-0	20x28	61	1900	Rut 252-421; NYCL 2154-2064; Rut 64
10	Schenectady	4401	1896	4-4-0	14x22	63	1900	NYC&HR 49; Rut 100; NYCL 33; Rut 99
10	Schenectady	6128	1901	4-4-2	19x26	69	1901	NYCL 2900-2800-3800-800
10	Schenectady	5181	1899	4-6-0	20x28	70		ex-NYCL 2002; ex-2028; ex-NYC 950. To NYCL 2002 again, 1903-4
11	Schenectady	1655	1882	4-4-0	17x24	64		ex-NYC 452; ex-256; To 4th #1
11	Schenectady	6136	1901	4-4-2	19x26	69	1901	NYCL 2901-2801-3801-801
11	Schenectady	5182	1899	4-6-0	20x28	70		ex-NYCL 2003; ex-2029; ex-NYC 951. Back to NYCL 2003, 1903-4
12	Schenectady	2221	1886	4-4-0	17x24	64		ex-NYC 494; ex-267; ex-489; ex-276. To 4th #2
12	Schenectady	6137	1901	4-4-2	19x26	69	1901	NYCL 2902-2802-3802-802
12	Schenectady	5184	1899	4-6-0	20x28	70		ex-NYCL 2005; ex-2031; ex-NYC 953. Back to NYCL 2005, 1903-4
13	Schenectady	4394	1896	4-4-0	20x24	73		To 2nd #3, etc.
15	Brooks	2667	1896	4-8-0	21x26	55	1896	BR&P 139. To Cumberland & Manchester #56.

Locomotive Names

Road No.	C/N	Name
1	4437	Beauharnois
2 (4)	2677	Kushaqua
3	2678	Cascapedia
4 (2)	2677	Kushaqua
6	2668	Mattawa
7	2669	Mirimichi
8	2670	Madawaska
10	4401	Ne-Ha-Sa-Ne
15	2667	Manitou

Presentation of the foregoing rosters was made possible through the aid of Messrs. Robert Brown, Carl F. Graves and Robert C. Schmid.

A History of the Elkhart & Western Railroad Company

"The Bucklen Line"

By J. Harold Kiracofe

The Elkhart and Western Railroad was the dream of Herbert E. Bucklen, a resident of Elkhart and Chicago. It was a practical dream to break the hold of the Lake Shore Railroad over Elkhart shippers. The coming of the railroad had almost wiped out river traffic within a year after the arrival of the first train and rates for freight traffic were developed strictly on a "what the traffic would bear" basis. Mr. Bucklen proposed to end this monopoly and give Elkhart shippers an additional rail facility while opening up the new North Side industrial district which was being developed.

Mr. Bucklen's idea was the construction of a railroad from Elkhart to a connection with the Chicago and Grand Trunk at Mishawaka with the possibility of selling it to the Grand Trunk System. This would bring in direct competition with the Lake Shore and Michigan Southern which had been in complete control since the late 1850's. Mr. Bucklen began to quietly sound out local sentiment among his business friends and decided that the project was feasible. Local capital was interested. Accordingly a meeting was called of the individuals interested in becoming stockholders of the Elkhart and Western Railroad Company. This meeting was held on Thursday afternoon, May 31, 1888 in the office of E. C. Bickel. The Hon. J. R. Beardsley was elected temporary chairman and Strafford Maxon as temporary secretary.

Articles of incorporation were completed and filed on May 4, 1888. The corporation was to be known as the Elkhart and Western Railroad Company. The capital stock of the company was set at $300,000.00 in certificates of $50.00 par value. Seven directors were chosen, Herbert E. Bucklen, James R. Beardsley, Justice L. Brodrick, Emanuel C. Bickel, William J. Davis, Charles H. Winchester and Strafford Maxon. The Articles of Incorporation stated the terminals from which the road was to be built: "said road to be constructed in Elkhart, Elkhart county, Indiana and the place said road shall extend is to or near the western limits of South Bend, St. Joseph County, Indiana."

There were seventeen original stockholders with varied amounts of stock:

J. R. Beardsley,	Elkhart	20	shares.
H. E. Bucklen	Chicago	50	"
J. L. Brodrick,	Elkhart	20	"
E. C. Bickel,	"	20	"
A. R. Beardsley,	"	20	"
Henry C. Dodge,	"	20	"
J. P. Primley,	"	20	"
O. M. Lumbert,	"	20	"

S. M. Cummins,	Elkhart	20	"
C. H. Winchester,	"	20	"
S. Maxon,	"	20	"
E. A. Warfield,	Chicago	20	"
B. F. Jacobs,	"	20	"
Newton Goodwin,	"	20	"
William J. Davis,	"	25	"
Charles A. Terrell,	"	50	"
Oscar Cobb,	"	15	"

Officers were elected on June 12, 1888. They were, H. E. Bucklen, President; J. R. Beardsley, Vice-President; E. C. Bickel, Secretary; C. H. Winchester, Treasurer; S. Maxon, Auditor; E. C. Bickel, General Manager; E. A. Warfield, General Western Agent. At this meeting, General Manager-Secretary Bickel was engaged as the purchasing agent for the new line with orders to buy the right of way from the city of Elkhart to the connection with the Grand Trunk Railway at Mishawaka. His fee for this service was set at $300.00 together with a further compensation of 10 per cent of all money saved the company under $5000.00 in procuring the right of way.

The directors authorized General Manager Bickel to employ a Mr. V. Peck, civil engineer, on June 30, 1888. His salary was to be $150.00 per month and his duty to make a proper survey of the line between Elkhart and Mishawaka. Surveying started a few days later and plans for the new road began to take shape.

The directors met on August 25, 1888 with General Manager Bickel and his engineer to receive a report of the results of the survey. Approval was unanimous that the project should proceed as planned and the Directors voted to establish the Eastern terminal "on Johnson street in the City of Elkhart, a little north of the Race bridge. The western end at or near the west end of Front street in Mishawaka with a spur to the Chicago and Grand Trunk."

Actual construction started in the Fall of 1890 with the construction of a "Y" connection with the Cincinnati, Wabash and Michigan Railroad near Cassopolis street. Most of this was done by ordinary labor with shovels and wheel barrows purchased from Borneman and Doll. By May of 1891 the line had been extended west to the new industrial district on West Beardsley Avenue and had reached the plant of The Elkhart Carriage and Harness Company. Construction stopped for bad weather. Switching operations were handled by the Cincinnati, Wabash and Michigan.

The directors met on May 28, 1891 to receive a full report on progress from Secretary-General Manager Bickel. The Secretary gave a combined progress and financial report as follows;

Cash received from donations	$3280.00
Cash received from stock assessment	1975.00
Cash received from H. E. Bucklen, (Loan)	5789.22
Total	11044.22

Paid out, right of way	$5452.00
Paid out, construction	5046.14
Paid out, general expenses,	406.96
Cash on hand,	139.12
	11044.22

Mr. Bickel reported that the line was completed from the C. W. and M. connection to Riverside Shops and that an operating contract had been completed with the C. W. and M. who would operate the road and serve the Riverside Shops.

Several weeks later an editorial in the *Elkhart Truth* reported: "Mr. Bucklen contemplates building the Elkhart and Western between this place and Mishawaka this summer. This will give Elkhart an opportunity to connect with the Chicago and Grand Trunk Railway and an effort should be made to induce that railroad to construct an air line from some place in the east, connecting with the Elkhart and Western. The advantages of such a connection can hardly be overestimated in view of the fact that they will give a competing line east and west, another express company and cheaper passenger and freight rates." There is no question that freight rates were a live question with the shippers of Elkhart. Competition was the only way to secure any rate adjustment. The Lake Shore began to take official notice of the new road since freight began to move out and in over the C. W. and M. to competing transcontinental lines.

The line again started building early in the Spring of 1892 as the road had earned a little revenue and had raised some additional money from the sale of stock. The line was extended west across Plum Street to the Kimbark Plant (later the Inner Brace.) Right of way agent-General Manager and Secretary Bickel was busy and deeds to the necessary lands to the west began to reach the Recorder's offices in Goshen and South Bend. The new road paused again to get its breath and consolidate its position.

The *Elkhart Review* reported on January 27, 1893 that; "The Elkhart and Western Railway Company has advertised for 30,000 ties with which they will extend their line to Mishawaka in the Spring. Good enough, there is room for all, the B. and O., the Three I and Michigan Central extension, the spur from Nappanee to Benton Harbor." Note—None of these proposed lines were ever built, the Vanderbilts saw to that.)

The Elkhart and Western did advertise for the ties and stated that they would pay up to forty cents for each white or burr oak tie, six by eight inches and eight feet long. These were to be delivered on their right of way anywhere between Elkhart and Mishawaka. When questioned on the quantity of ties, General Manager Bickel stated, "he was a great deal in the dark but was acting under orders from Chicago in advertising for ties. But," said he, "don't suppose a man would buy a lot of material to lay in a fence corner and rot, do you?" Mr. Bickel also announced that on Feb. 2, 1893, the company had purchased a

plat for a station at Pleasant Valley, five miles west of Elkhart. This plat was five acres purchased from Samuel Heiss. The Perley Lumber Company of South Bend was the successful bidder for the ties and also later furnished the bridge timbers for the bridges at Mishawaka and possibly those at Elkhart also.

Mr. Bucklen came down from Chicago on Feb. 17, 1893 to check on the progress of the road. In an interview with a reporter of one of the local papers, he predicted that if all his expectations came true, the people of Elkhart would be given the opportunity of going to the World's Fair over the Elkhart and Western. (Note—Mr. Bucklen's prediction came true.)

The *Mishawaka Enterprise* of March 3, 1893 reports; "The right of way through all the territory but three farms have already been secured and the way will be ready, doubtless when the time comes for track laying, which will be as early as possible in the spring. It is the intention of the company to begin building from this end (Mishawaka) of the line, starting in at the Grand Trunk depot where connection will be made with the latter road." "In addition to the Grand Trunk connection, it is the desire of the company to cross the river, tap the factories along the south race and run a line to connect with the Vandalia at South Bend."

"The new line is already receiving overtures from prominent points in Michigan urging an extension of the road eastward and there is little doubt that eventually this will be done. With a junction of the two lines at this point, Mishawaka becomes a natural and proper location for the Grand Trunk Shops, which rumor has long intimated were to be built somewhere in this vicinity. It is also now intended to extend the line from Elkhart to Goshen, thus forming a sort of belt line for the group of four flourishing cities." (Note—South Bend, Mishawaka, Elkhart and Goshen.)

General Manager Bickel and an Elkhart attorney filed eighteen deeds with the Recorder of St. Joseph County on March 6, 1893. These deeds were for the right of way through Penn Township, St. Joseph County and represented a cost of $4080.00 expended for the properties. The South Bend papers took notice of this event and commented, "If the road could be extended to the Vandalia in this city, the line can get cheap right of way along the river bank and will give certain of our factories an easy opportunity to secure competitive freight facilities." Evidently South Bend had been suffering from a rate situation also. March 11, 1893 saw Mr. Bucklen, General Manager Bickel and Chief Engineer French of the Chicago and Grand Trunk making the final survey for the Mishawaka connection of the Grand Trunk. Chief Engineer French pronounced everything satisfactory and Mr. Bucklen announced that the work of construction would begin at once.

General Manager Bickel came back to Mishawaka on March 24, 1893 and after a lengthy negotiation, purchased the right of way through the Fred Lang property on the North side. This was the last obstacle. It had taken Mr. Bickel nearly four years to secure the right of way. A total of fifty two deeds were executed and recorded to com-

plete the transaction. The construction contract was immediately advertised and the new road was finally ready to break ground.

Bick and Glenn of Toledo, Ohio were awarded the grading contract and actual construction started Friday, March 31, 1893 when the switch connection was made with the Chicago and Grand Trunk Railway halfway between their depot and Bridge Street (Now Main St.) The road was to run straight to the St. Joseph River, then turn towards Elkhart. The contractors advertised for fifty men and fifty horses and announced that they contemplated having the grading done in 90 days. One of the local men furnishing teams for this project was Arthur P. Perley of South Bend who furnished fourteen horses under contract. The work proceeded rather well except that the contractors reported that they could use more men and teams.

The first stretch of grading, from the Grand Trunk Freight House to a quarter of a mile east, was done in a short time. It was soon ready for ties and rail. Material was already beginning to arrive over the Chicago and Grand Trunk. The contractor brought in a huge new grader to expedite the work. This grader required twelve horses to operate it and moved a tremendous amount of earth. Many sightseers visited the project to see the grader in action. By May 1st, 1893, the contractor was paying out nearly a thousand dollars on each pay day. Elkhart papers were complaining that no Elkhart men were working on the project. General Manager Bickel quickly retorted, "No Elkhart men have applied for work or they would have been employed immediately." It was not so easy to get to Mishawaka from Elkhart in those days since the Lake Shore or a horse and buggy were the only methods of getting to the job.

The Town Board of Trustees of the Town of Mishawaka met on June 1st, 1893 and unanimously passed an ordinance granting the Elkhart and Western trackage rights to the South Race. The Elkhart and Western guaranteed to have the line completed by January 1st, 1894. General Manager Bickel was present at the Meeting and gave a report to the Town Board of the road's progress. He also mentioned its future plans. In fact, General Manager Bickel was very much in evidence in Mishawaka almost every day. Not only was he supervising the work but was selling stock in the road and looking over future purchases of right of way. On May 23, 1893, he was given the high honor of sending and receiving the first paid wires over the new Postal Telegraph Company wires from Mishawaka.

The Elkhart and Western Directors met in Elkhart on June 2, 1893 to receive an optimistic report of the roads progress. They were presented with a proposition from the City of Laporte. That city was desirous of having the road extended to their city. The request was given some study and then tabled temporarily. After the meeting, the directors drove by horse and buggy over the new line from Elkhart to Mishawaka to personally observe the progress of the work. They found that the rush of material had caused a freight blockade at Mishawaka. General Manager Bickel had already taken steps to remedy this condition by starting on the spur which was to cross the river and tap the

industries along the south race. The spur had already been graded to the town limits of Mishawaka

The Elkhart and Western was not neglecting the Elkhart end of the line even tho the heavy construction was at Mishawaka. General Manager Bickel gave an interview to the *Elkhart Review* which was reported in their issue of June 9, 1893; "The Elkhart and Western will locate its principal depot on the grounds in the rear of Hotel Bucklen. Arrangements have been made, perfected and the surveys made. The line will cross the St. Joseph River near the old saw mill and crossing the Island at the east end, thence across the flat to the Elkhart (River) and over that north of the Jackson Street bridge. There will be a landing place on the Island for excursion parties and it is likely a station will be made near the Elkhart Water Works, for the accomodation of people from the north side."

The Editor of the *Mishawaka Enterprise* drove over the line in his horse and buggy and gave his report of progress on June 23, 1893. He stated, "A drive over the line of the E. and W. the other day shows good progress being made on the grading and track laying. The track is already laid for a distance of three miles or more from the Grand Trunk depot, together with a long side track and the beginning of a spur to tap the factories along the south race. This spur is already graded and the track partially laid up to the corporation limits. Considerable trouble is experienced where the main line strikes the marsh at Willow Creek, the ground being very soft and hard to work with all the wet weather this spring. Another bad piece of marsh will be encountered further east and the next difficult work is at Covert's Creek, near Elkhart, where a gang of graders are now at work. A new engine is expected for the road in a few days and the work will be pushed to completion as rapidly as possible. While the track will be put down as speedily as possible, nothing about the work is being slighted in the least. In fact, it is a model railway line, ties, rails and all mentioned being of the best, while the grading and the road bed will be perfect in every particular."

June 30, 1893 saw the big event, the arrival of the first locomotive. President Bucklen and General Manager Bickel were in town for the arrival. They had made arrangements the day before for water and fuel facilities. The locomotive came into Mishawaka from the west in a Grand Trunk freight train and was switched by the Grand Trunk engine over onto its own line. It was a little American type 4-4-0 purchased second hand from the Northern Pacific, at least that is the rumored origin. Data on this locomotive as well as the later one purchased has long ago disappeared. The E. and W. borrowed a few flat cars from its neighbor, the Grand Trunk, and prepared to put the new locomotive to work. There was great excitement on Bridge Street when engineer Rufner proudly tooted the whistle and opened the throttle for the first run. It was a complete success. The little engine was equipped with link and pin couplers and steam brakes.

By the end of July, 1893, the new road was completed as far as Pleasant Valley. The road had established a station at Willow Creek

and proceeded to build one at Pleasant Valley. The company proudly announced that it would make the connection with its Elkhart end of the line by August 1st and then would return to Mishawaka to complete that end of the line. The road did not quite make their goal. The *Elkhart Review* reported that the first locomotive came over the line on August 28, 1893. The first car of freight came over the new line from Mishawaka the next day, August 29, 1893. This was a car of meat from Chicago to the Chicago Meat Market at Elkhart. Elkhart business men were elated, the monopoly of the Lake Shore and Michigan Southern was broken and Elkhart had her new rail connection to the east and west. A new station called Riverside was located at Main Street near the Elkhart Water Works and the railroad began to prepare for passenger business.

Pile driving for the bridge across the St. Joseph River at Mishawaka began late in August of 1893. The management announced that they intended to establish passenger service with at least two trains daily. Darwin F. Coe became Traffic Manager and established headquarters at Elkhart. President Bucklen purchased another piece of equipment, a steam hand car, for the convenience of inspecting officials in covering the road. This steam handcar was not a success and there are rumors of officials walking back home. In any event, it was soon discarded.

August 14, 1893, by special invitation of the management, Mr. H. C. Niles and Editor Jernegan of the *Mishawaka Enterprise* were taken for an inspection trip over the line. Editor Jernegan reports; "Parlor cars or coaches of any sort are not yet included in the rolling stock of the road, so the passengers were obliged to take such seats as could be found on the engine or the flat car. The road is now completed to within two and one half miles of Elkhart and a better piece of new road bed has never been constructed. The line is much smoother to ride over, even in its present new condition, than many so-called first class roads."

He continues; "The road is constructed on as nearly an air line as possible. There is a curve near the McKnight crossing (Fir and Jefferson Roads) and from there on to the present terminus is some six miles of straight track and as perfect a line as could be asked for. Side tracks have been put in at Pleasant Valley and Covert's Creek for future station use. At Willow Creek a portable saw mill is engaged in cutting ties. Another mill is also at work getting out ties at Crum's Point on the Chicago and Grand Trunk R. R. The lack of ties has brought the work to a standstill. Ten carloads of ties from Kentucky are on the way, and as soon as they arrive, the road will be completed on to Elkhart. On each side of the line, the road is being fenced with a substantial eleven strand woven wire fence. The material for the big bridge which is to be built across the St. Joseph at this point, to enable the E. and W. to reach Mishawaka's south side manufacturing district, is now being hauled and work on the structure will begin early next week and pushed to completion."

Crossing of the St. Joseph River was not accomplished without incident. The Mishawaka Hydraulic Company objected to the bridging of

the north and south races. General Manager Bickel spent Monday August 21, 1893, arranging with the Hydraulic Company for the necessary permission. The company finally gave its consent to cross the north race but could not decide on what type of bridge to erect over the south race. The railroad wanted to put in piling and truss bridges while the Hydraulic Company wanted and insisted on span bridges. Compromise was the order of the day and the railroad won its point. Piling had reached the middle of the river by the first week of September, 1893 and the work was being pushed as fast as possible. The railroad was anxious to get freight revenue coming in.

There was a reason why the railroad was anxious for revenue. The "till" was almost empty and if further expansion was to be made to tap the Mishawaka factories for traffic, money had to found. President Bucklen stepped in to rescue the road by purchasing $100.000.00 of the roads general mortgage bonds and work proceeded on schedule without missing a day. President Bucklen had not forgotten his promise to have the road ready for World's Fair patrons.

On Tuesday, September 19, 1893, the Elkhart and Western announced the opening of its passenger service by handbills and advertisements in the Mishawaka and Elkhart papers. The first passenger train was to be an excursion from Elkhart to the World's Fair at Chicago which was to be scheduled for Tuesday, September 26, 1893. The road announced that a committee of leading citizens of Elkhart and Mishawaka were cooperating to make the first run a huge success. Grand Trunk coaches were to be used, the train to leave Elkhart at 6;30 a. m. with stops at Riverside, Pleasant Valley and Willow Creek The coaches were to be hooked on to Grand Trunk trains to and from Mishawaka. The roundtrip fare was $2.65.

The excursion was a big success. Three hundred started from Elkhart and over fifty from Pleasant Valley, Willow Creek and Mishawaka. Handsome badges were distributed to the passengers as souvenirs of the occasion. The train carried a large sign "Elkhart Day-Indiana". Among the passengers from Mishawaka were the following prominent citizens; M. and Mrs. H. G. Niles, J. F. Eberline and wife, A. Herzog and daughters, Josephine and Anna, Charles Johnson, Mr. and Mrs. E. Volney Bingham, J. C. Snyder, John S. Myles, Mrs. A. Eberhart, John Grimes, Fred Eberhart, Jr. Dan Judie, Frank Block, Charles Cole and a number of others that are not recorded. About twenty five of the excursionists did not return with the train but came back the next day and since there were no coaches available, the entire party including President Bucklen, rode to Elkhart in a box car which was hurriedly fitted up for temporary service. The E. and W. employees facetiously labeled it "The World's Fair Train" in chalk on the side of the car.

The second week of October, 1893 saw the establishment of regular passenger service with two trains daily between Elkhart and Mishawaka. Train No. 1 left Elkhart at 7.30 A. M. and train No. 3 left Elkhart at 1;30 P. M. On the reverse side of the timecard Train No. 2 left Mishawaka at 8;00 A. M. and train No. 4 departed at 3;00 P. M. The

new service was an instant success. The *Mishawaka Enterprise* made note that "The fastest time on the L. S. and M. S., besides that of the Flyer, between Mishawaka and Elkhart is twenty minutes. The E. and W. goes this a little better and makes the run in seventeen minutes. There are sixteen highway crossings between the two towns." The E. and W. now had its own coach and the borrowed one was returned to the Chicago and Grand Trunk. Money again became a bit scarce and the management decided to retrench by laying off all the construction workers except those who were actually working on the St. Joseph River bridge at Mishawaka.

The piling for the new bridge was completed by the middle of October, 1893 and the building of the superstructure began. The rails were laid on the bridge and the first trip across by the locomotive was made on Tuesday morning, Nov. 7, 1893. A large crowd gathered in the afternoon to see the first train cross the bridge. President Bucklen and General Manager Bickel invited the crowd to a free ride and the coach was quickly filled. The locomotive slowly pulled across the bridge with a cheering crowd awaiting its arrival on the south bank. President Bucklen spoke to the crowd, then gave the signal for the return trip to the Chicago and Grand Trunk depot.

A group of Elkhart business men, anxious to see the the progress of the road, made a critical inspection trip over the road on November 17, 1893. The *Elkhart Review* reports, "They were all agreeably surprised to find a splendidly constructed bridge. It is something like the new bridge of the Big Four in this city but has two feet more breadth and oak guards set up edgewise instead of pine flatwise, giving it great strength and durability. It is the longest bridge of any kind in St. Joseph County and the citizens of Mishawaka seem to take great pride in it. They tell of the exploit of an old gray horse the day before. He walked from one end of the bridge to the other and the bridge across the race on the ties, finally ending by tumbling into the race on the return trip and swam ashore none the worse for his mishap." "This party of Elkhart business men consisted of Mayor Thompson, E. C. Bickel, Isaac Grimes, Alex Gordon, John Thornton, A. E. Pope, J. N. Bick, John Cook, C. H. Winchester, James Kavanagh, John McNaughton, Ed. Phinn, C. H. Chase of the *Review,* and C. R. Richter of the *Truth.*"

"The return trip was made in the dark with the engine reversed. While running at considerable speed near the Post farm, they struck a cow and a two year old steer, both of which rolled underneath the train for a distance and were finally run over by the car and engine wheels. The wonder is that the train was not derailed and rolled into the ditch which at that point is eight or ten feet below the track." "The E. and W. began pushing their south side track westward this week and the grading and track laying is progressing along Front street (Mishawaka) as fast as possible, although Wednesday a heavy snow fall interfered some with the work. It is hoped to have the line in running order to the Western limits of the town before winter sets in and next Spring the road will undoubtedly be continued on to South Bend

where it will tap the Vandalia." The little road had big aspirations but it never made the Vandalia.

The Mishawaka Pulp Company loaded the first outbound carload of freight on the new line from Mishawaka on November 29, 1893. This fulfilled the roads agreement to have the line in by a specified time and the management now called upon the Mishawaka Business Men's Committee to complete their part of the agreement by paying up their several subscriptions. The management also called for additional subscriptions pointing out that the new road was a great asset to Mishawaka and the contemplated western extension would make it more valuable. The subscriptions were paid and some new subscriptions were paid in. The company, thus encouraged, petitioned the Mishawaka Town Board of Trustees for permission to cross Mill street and Spring street with a switch track. Permission was not long coming.

The E. and W. established a waiting room for passengers in the City Water Works building and hired Chief Engineer Tom Bliss to act as their agent until a new depot could be built. Ticket sales were heavy with one way tickets selling for thirty-five cents, round trip tickets at sixty cents. Parties of ten or more received special rates of twenty five and forty cents. Freight shipments began to use the new line with several going out nearly every day. The road advertised "Try the Pleasant Valley Line for Elkhart, time twenty five minutes." Work also began again on the Elkhart end of the line to extend it towards a new down town terminal. A contract was signed with the National Express Company in December of 1893 to give Elkhart an additional express service. The Elkhart and Western was out to give the Lake Shore some real competition.

Other cities were viewing the Elkhart and Western and its progress. The Business Men's Association of Laporte appointed a special committee to confer with the officials of the Elkhart and Western with a view of extending the road on to Laporte. The citizens of Goshen were also interested in securing an extension to their city. Several conferences were held but no definite conclusions were reached since President Bucklen and the Board of Directors were reluctant to extend without firm guarantees.

Out of a clear sky, trouble descended on the new road. A Mr. Waldorf who owned a small brick yard on the east edge of Mishawaka, sued the road for damages supposedly done to his business during construction by his place of business. John Schroff, a contractor, sued for payment of bridge material. Both of the suits were decided in favor of the company but put quite a drain on the capital to defend. A heavy blizzard in February of 1894 closed the line for several days. One of the passenger trains was stuck in a drift near Pleasant Valley. It took a crew of shovelers several hours to get the train dug out.

Rumors of the future of the Elkhart and Western continued to fly. General Manager Spicer and several other high "brass" of the Chicago and Grand Trunk created quite a stir when they arrived unannounced in Mishawaka on the morning of February 10,1894. They made a hasty inspection trip over the Elkhart and Western and took

the first train out. The South Bend *Tribune* indulged in a bit of speculation—"The visit of the officials of this powerful road and their personal inspection of the line as well as the proposed route to this city, has strengthened the belief and the *Tribune* has it on good authority as is possible to get information regarding railroad matters that the G. T. has gained control of the E. and W. and will at once continue the extension of the line to this city on the south side of the river. Then it will go north by way of Buchanan and Berrein Springs to Benton Harbor and St. Joseph."

"There was something very suspicious about the actions of the G. T. men when they were here to say the least, and General Manager Spicer is said to have had that peculiar far away look to his eye that men have when they are turning great projects over in their minds as he stood out on the marsh busily occupied with his own thoughts and with his face steadily fixed in the direction of Old Lake Michigan at a point where the compass would indicate the crystal waters of the St. Joe rush out to mingle with those of the great sea." In any event, General Manager Spicer kept his thoughts to himself. His report was made to his superiors and was never published.

There were other rumors floating around. There were several reports of various mysterious backers for the Elkhart and Western. Ostensibly it was Mr. Bucklen, the rich medicine man, formerly of Elkhart and now of Chicago. Then again, it was said to be a Baltimore and Ohio project attempting an entry into South Bend and then on to Lake Michigan. Other people had it a Chicago and Grand Trunk enterprise for securing entry to Elkhart and Goshen. The Three I line was actively interested in the new little road since it promised an entrance to Elkhart with possibilities of eastern extension. The Three I proposed an extension of their line to Mishawaka to connect with the Elkhart and Western near Logan Street and actually started the negotiations for a franchise with the town of Mishawaka. A possible extension to connect with the Vandalia at South Bend was also under consideration. The E. and W. was not standing still. Mr. Bucklen still had ambitious plans for his road.

On March 5, 1894, A. F. Nims, engineer for the Elkhart and Western, began to survey the route from the eastern terminus of the line on the proposed depot site in the rear of Hotel Bucklen at Elkhart. Trouble started immediately after the C. W. and M. heard of the proposed extension and work stopped temporarily on the east end. The road suffered a severe blow in the resignation of General Manager Bickel who resigned on Wednesday, April 4, 1894.

On the Mishawaka end, Mr. Bucklen was proceeding with his terminal project. The Mishawaka *Enterprise* of April 27, 1894, reports Mr. Bucklen has purchased of the St. Joseph Manufacturing Company, the block of ground adjoining on the North, fronting on Bridge and Race streets as well as the Chris Taylor blacksmith shop property to the west, thus acquiring the whole block. The price paid for the first named property was $7000 cash. It has several old buildings on it as

well as one fine new brick warehouse which will suit the E. and W. admirably for a freight depot. The price paid for the Taylor property was $2500.00. Already a new industry has been secured on account of the shipping facilities provided. This is a new paper mill. A side track is to be put in at once, running to the site of the new paper mill. Another switch will be run to the premises of the Roper Furniture Co., the Mishawaka Woolen Co., Perkins Windmill Co., and the St. Joseph Manfacturing Company."

In May of 1894 the road secured the W. L. Jetton homestead with four acres of ground for $3500.00, the May property on Water street for $1200.00 and the property on the corner of Front and Bridge streets belonging to the Ripple Mills Co., which had a double house and blacksmith shop on it. With the purchases of the properties taken care of, the new road began the construction of a terminal yard for the western extension and for the storage of empty cars. Contractors Johnson and Chandler began grading the Jetton hill and changing the creek channel by tiling it into the St. Joseph river at the foot of Hill street. This work with the new sidings was completed in June of 1894.

The argument with the C. W. and M. was settled early in May of 1894 and President Bucklen proudly announced that cars would be running to a central point in Elkhart within 60 days. He made that proud announcement on May 11th and work on the St. Joseph River bridge started that same day. Right of way had been purchased along the west bank of the Elkhart river to the Lake Shore (Old Road) tracks at Prairie Street. Here the line was to terminate until further plans for extension were made. President Bucklen also announced that a handsome new combination car was on order with the Pullman Company and would shortly be received for passenger service.

The stockholders met in annual meeting on Thursday afternoon, May 31, 1894 and elected the following Board of Directors; H. E. Bucklen, C. H. Winchester, E. C. Bickel, J. L. Brodrick, J. R. Beardsley, H. C. Dodge, A. E. Warfield, W. C. Davis and S. Maxon. Officers were elected as follows; Pres. H. E. Bucklen; Vice Pres. J. R. Beardsley; 2nd Vice Pres. A. E. Warfield; Auditor, S. Maxon; Treasurer, C. H. Winchester; Secretary, O. L. Allen. No successor to General Manager Bickel was elected and evidently Pres. Bucklen assumed this position as he was very much in evidence from this time on in the roads affairs. The directors voted another $100,000.00 of bonds to complete the road from Mishawaka to South Bend and also to complete the line to the L. S. and M. S. connection at Elkhart.

June 4th, 1894 saw the laying of the foundations for a new passenger station in Mishawaka at the corner of Bridge and Front Streets. This was a red brick structure 70x120 feet with a tower adorning the top. The office was in the Southwest corner directly under the tower and had a large bay window. Two waiting rooms connected with the office. The building was erected under the supervision of John Esberg of Elkhart. Passenger traffic was heavy. Delegates to the Republican Congressional Convention in 1894 travelled from South Bend and Mishawaka over the Elkhart and

Western and the Big Four (Former C. W. and M.) to Warsaw. The South Bend group came over by street car to Mishawaka since the street car service made a close connection with the new line's passenger station.

The Western extension was still being pushed. John Zaehnle, Henry C. Morgan and Robert Myles appraised two pieces of land for the E. and W. One was Lot No. 10 on Front Street owned by Joseph Ganser and the other Lot No. 11 owned by Andrew Tremmel.

The July 6, 1894 issue of the Mishawaka *Enterprise* lists the following pieces of real estate purchased and recorded by the Elkhart and Western:

St. Joseph Mfg. Co., Lots 11 and 13, Tuttle's acres	$7000.00
Christopher Taylor Lot. Lot 12, Tuttle's acres	2500.00
Mish. Bldg. and Loan Association. Lots 20, 21, 22, 23, and 24 Fowlers First Addn.	300.00
Fannie A. McCollum, et al. Lots 25, 26, 27, 28, 29 and 83 Fowler's Second Addn.	300.00
Lavinna R. Jennings. Lot 139 - part Lot 140 Fowler's First Addn.	400.00
L. E. Calkins. Lots 25, 26, and 27, Fowler's First Addn.	400.00
Napoleon C. Pompey. 43 and a half square rods.	27.18
Mercy A. Miller, et al. 1 and one quarter acres	187.50
Parden J. Perkins. Right of way, Front Street.	175.00
Nancy Finch. Right of way, Front Street	250.00
Betsey Warren. Right of way, Front Street	300.00
John Ludwig. Right of way, Front Street	200.00
Geo. Moon, Guardian. Undivided half of four acres	250.00
Frederick Ludwig. A small tract.	50.00
Eberhard Milling Co. Lots 9, 10 and 14, Tuttles Acres.	22.00
John May. Lot 12, Front Street.	1200.00
William Jetton, Lots 3 and 12, West Street Part Lot 2 in Hurd's Addn.	3500.00

Condemnation proceedings were instituted against the Kamm and Schellinger Brewing Company late in July of 1894 as the E. and W. wished to secure right of way in front of the Brewery property. This piece of right of way was vital to the western extension of the line. Work stopped pending the legal determination of the case. The great railroad strike of July 1894 struck the country. The Elkhart and Western was practically the only steam road in the middle west unaffected by the strike but freight traffic dropped off while the passenger business boomed. The E. and W. in connection with the street railways was the only route open between South Bend and Elkhart.

The E. and W. continued work on the Elkhart end, building a "Y" and roundhouse just east of North Main Street along Christiana Creek. The road had no turntable and the "Y" was necessary to turn the engines. By the middle of July the St. Joseph River bridge had

been completed, the fill across the east end of Island Park had been made and work had started on the second bridge. The road again ran into legal complications with George Tibbets who refused entry to his land which the new road must have to reach its terminal back of the Bucklen Hotel. The E. and W. took matters into its own hands without waiting for legal proceedings. President Bucklen took fifty workmen and rushed the track across the Tibbets property after midnight on Saturday night. Legal proceedings would have held up the progress for months. With the road in possession, the claim of Mr. Tibbets was shortly disposed of.

Workmen began the construction of a small depot on Island Park in the middle of August. When this job was completed, the crew moved on to build the freight and passenger stations behind Pigeon and Jackson Streets along the west bank of the Elkhart River. The State Board of Tax Commissioners took official notice of the new road in August of 1894. After an inspection of the road, the main track was assessed at $6000.00 per mile, side tracks at $2200.00 per mile and the rolling stock at $500.00. The road began the construction of a coal dock and yard just north of Jackson Street and prepared to go into the coal business as well as coal locomotives.

September of 1894 brought George Shope from Ligonier to Mishawaka to act as agent for the Elkhart and Western. The new passenger office was opened shortly thereafter under his charge. Mr. Shope became Traffic Manager for the Dodge Manufacturing Corpn., of Mishawaka in later years. The second bridge over the St. Joseph River at Elkhart was completed late in September and a Mr. Turner was given the contract for the last bridge, that over the Elkhart River and immediately began construction. October of 1894 found the litigation with Kamm and Schellinger Brewing Company settled and the right of way secured and construction was started towards South Bend. The road built a siding west to the Brewery and stopped for two reasons,—winter and money. The western connection was talked about several times but never materialized into actual construction. The purchase of right of way, a new coach and a second engine had just about taken all of the finances of the road. The new coach arrived in November and was placed in service with considerable advertising to announce it.

O. L. Allen, secretary of the company, resigned in May of 1895 to accept a position in Chicago and Mr. R. Jones came from the Detroit office of the Chicago and Grand Trunk to replace him. The road had done a heavy freight and passenger business during the winter and spring, in fact, it greatly exceeded the expectations of its promoters. The new stations in Elkhart had proven a good investment. The express company had made a successful bid for business with Elkhart merchants and overnight fast freight service from Chicago in connection with the Grand Trunk had picked up considerable former Lake Shore customers. Meat from the packing houses and banana cars began to come in via the new road.

The Board of Directors met on April 30, 1896 and received the following report from the Secretary:

Payments made July 14, 1888 to April 30, 1896.

Real estate and right of way	$37426.76
Engineering	3275.96
Grading and roadway	30244.71
Ties and plank	19972.68
Bridges and culverts	21948.02
Rails, frogs and switches	59246.18
Labor	9178.93
Tools	310.29
Fence and cattle guards	5748.49
Payroll	3664.02
Equipment	6601.77
General expense	8377.80
Buildings	10450.04
Freight	5757.68
Supplies	193.93
Cash returned to H. E. Bucklen	61161.67
Total	$282658.38

The "Free Silver" and "Sound Money" campaigns of the politicians were in full hue and cry in the summer of 1896. President Bucklen, who had previously announced that he was planning a northern extension of the E. and W. to Michigan (Note—He never did specify to what points) gave out a public statement that he would do absolutely nothing until the "money craze" was settled. Gene Roper who had followed George Shobe as agent for the road, resigned and was succeeded by his brother, Harry Roper, who took over the agent's duties on September 9, 1896.

President Bucklen was not one to overlook a traffic opportunity and regardless of the money question, completed his new side track into the Mishawaka Woolen Company plant. Passenger service was not neglected. The local political situation was getting hot and was climaxed with a mammoth McKinley celebration at Elkhart on the night of October 12, 1896. The E. and W. Special was loaded to suffocation with hot and perspiring Republicans. Over 600 made the trip from South Bend and Mishawaka including the Mishawaka McKinley Club, the South Bend McKinley's Club, Thayer's Band and a fife and drum corps. It was the largest political procession Elkhart ever saw. There were an estimated 20,000 people in town and the torch light parade was several miles long. McKinley was elected and things quieted down again with the E. and W. doing a good business.

1897 saw continued prosperity for the E. and W. Passenger traffic was brisk. The Methodist ministers of Elkhart, Mishawaka and Osceola held a five day meeting from August 11 to August 15th in a grove near Cobus Creek north of Osceola. Two meetings were held daily and four on Sunday. The Elkhart and Western ran special trains from Elkhart

and Mishawaka to all meetings. Island Park was a popular picnic spot for parties from Mishawaka and South Bend. The road carried many special parties to Island Park for Sunday outings. At Elkhart, the road promoted special parties to Springbrook Park at the east edge of South Bend arranging connecting schedules with the street railway at Mishawaka. Passenger revenue for 1897 ran nearly $2000.00.

The tax question became serious in 1897 and in August the officials of the road filed a petition for a reassessment with State taxing officials. The road had originally been assessed at $20,000 per mile which made a heavy tax burden since the road was still spending considerable money for expansion. The road was able to convince the State Tax Board that the earnings of the road were out of proportion with other roads because the E. and W. operated a coal company as part of the property and those earnings were lumped in with the earnings of the road. The Tax Board agreed that this was so and reduced the valuation to $14,000.00 per mile for the main line. On September 10th, 1897, the road proudly boasted that it had handled its longest train to date, twenty two cars, between Mishawaka and Elkhart. The Lake Shore began to take serious notice of its little competitor.

The success of the new road caused others to take official notice of the E. and W. Several different promoters came up with schemes to tie the E. and W. with their projected lines. In January of 1898, the Elkhart and Goshen Electric Railroad Co., proposed to use the tracks of the E. and W. from Elkhart to Mishawaka for their electric cars. They proposed to connect with the street railways at Mishawaka and proceed over their lines into South Bend. They proposed to extend the South end of their line to Lake Wawasee to make a total line of 53 miles. President Bucklen had been forehanded with the thought of using electricity on his own line for motive power instead of steam. He had wired the fish plates on his road when the rails were laid. This preliminary spade work being done, it would be a simple matter of sixty days to string the overhead wires. Negotiations were never completed as the electric line could not come to terms with President Bucklen who was unwilling to subordinate his line in the deal. Steam stayed as the motive power.

The Big Four had taken over the old C. W. and M. and the Elkhart and Western was interchanging considerable business daily with the Big Four. President Ingalls of the Big Four saw possibilities in the new line and sent General Manager W. F. Shaff to go over the little line and survey its traffic potential with a view of possible purchase. Mr. Schaff did make the survey and reported back: "While the business outside of Elkhart was limited, the terminal facilities at Elkhart might be worth the price asked for the whole line as it reaches the doors of all the large manufacturing concerns of that city. It is possible to extend the road from Mishawaka, its present terminus, into the manufacturing district of South Bend, some three miles, very cheaply and the only question now involved is the price."

February of '98 saw more rumors floating around as to the future of the E. and W. The local papers reported that the Chicago and Grand

Trunk and the Three I were also angling for purchase of the road and that negotiations were in process. The Chicago and Grand Trunk wanted access to Elkhart and the Three I wanted to extend eastward to Toledo. President Bucklen was a shrewd man in a bargain. He put an engineer to work surveying a possible route into South Bend and announced his intention to extend westward. It was a master stroke and brought the Lake Shore into the picture. It wanted no rival road entering the South Bend district. Negotiations became more serious.

Darwin F. Coe, traffic manager from the beginning of the road and the man primarily responsible for its success, resigned in April of 1898 and was replaced by A. D. McKnight of Mishawaka. Mr. McKnight came to the E. and W. from the Chicago and Grand Trunk office at Mishawaka, and was familiar with the new road and its traffic potential. He took office on April 8, 1898.

President Bucklen broke the official news of the sale to the Lake Shore on a visit to Mishawaka on May 22, 1898. The Lake Shore officials came to Mishawaka on May 26th and the transfer of ownership was made. Station Agent C. L. Burgess of the Lake Shore became the agent for both lines. Harry Roper, the E. and W. agent was offered a position with the Lake Shore. Other employees were also given the opportunity to go with the Lake Shore and most accepted the offer.

Many were the rumors as to what the final disposition of the new road would be. Lake Shore officials shook their heads when asked if the E. and W. would be torn up. One went so far as to state "A big price has been paid for the road and that money would not be thrown away by closing down the road". It never was closed and is still in daily operation handling a heavy freight traffic over its single track. Although passenger service was abandoned with the coming of the electric interurban in the early 1900's, it nearly became a carrier of railway mail. The little community of Pleasant Valley petitioned Congressman Brick for mail service via rail but Congressman Brick compromised by securing rural free delivery with a route from Osceola instead. It is now officially a portion of the Western Division of the New York Central which succeeded the old Lake Shore.

The editor of the Goshen *Democrat* gave a fitting and very apt epitaph on the absorption of the Elkhart and Western by the Lake Shore. He summed up the situation in the issue of June 10, 1898 as follows; "The road which came into being as one man's dream of breaking the Lake Shore's iron grip on Elkhart traffic, had a short life but a busy one. It had been a great freight rate demoralizer as far as the Lake Shore was concerned. It had opened optional routes to shippers of Elkhart to the east, west and north with the Chicago and Grand Trunk connection. It had given a badly needed passenger service to the St. Joseph Valley. It greatly aided in the industrial development of Elkhart and Mishawaka. It was one of the few railroad promotions of the 90's to become an actuality and a financial success. Its absorption was inevitable and a tribute to its value in the traffic picture of Northern Indiana." He closed with a classical quotation:—"Alas I was begun for so soon I was done for."

Acknowledgements:

Information on the railroads of Northern Indiana is hard to obtain and most of the record must come from the local newspapers. I wish to thank the Mishawaka *Enterprise*, the Elkhart *Truth*, the Northern Indiana Historical Society of South Bend, Emil Anderson, local historian of Elkhart and Elkhart County and others who so generously gave me the use of their files. I also wish to thank the Secretary of the New York Central System who so kindly allowed me to examine the corporation books of the Elkhart and Western.

The Steam Locomotives of the Pennsylvania Railroad System

Part II

By Charles E. Fisher

In the previous article, we briefly traced the origin and growth of this railroad and its motive power up through and a little beyond the Civil War. At the close of this conflict, the Pennsylvania, in common with other eastern roads, commenced to expand. The group of railroads west of Pittsburgh and Erie were acquired; certain railroads in New Jersey were consolidated into the United Canal & Railroad Companies of New Jersey and these properties were leased in 1871 and, ten years later, the Philadelphia, Wilmington & Baltimore R. R. was leased. This brought the road to the banks of the Hudson River, to Washington on the south and on the west to such cities as Chicago, Indianapolis and Cincinnati, much as it is today.

This increase in mileage resulted in an increase in motive power, thus placing more responsibility on that department. While John P. Laird was Master of Machinery at Altoona, 1862-1866, some attempt at standardization in the rebuilding of locomotives was made, but these war years were not conducive to anything other than to keep as many locomotives in service as possible. Alexander J. Cassatt, later to become one of their outstanding presidents, was appointed Master of Machinery on November 16, 1867, and it was over his signature that plans and drawings were prepared for eight standard classes of service.

It may not be amiss at this point, to state the method by which these standard locomotives were so rapidly placed in service. The new locomotives were built chiefly in the railroad shops at Altoona tho' Baldwin and the other builders furnished many a locomotive. Locomotives built other than at Altoona were just the same as those of the same class built in the company shops. All were built to the same designs and specifications. But, in the early days of standardization, the Altoona Machine Shops and the Baldwin Locomotive Works were the principal builders and the speed with which they could deliver, plus the corporate finances, regulated the speed of standardization. Rather than "run the Wheels" from under a non-standard locomotive by neglect, if it would bring a good price in the market, the locomotive would be sold. There was no "dumping" of old non-standard locomotives on the subsidiary roads. As early as 1873, out of a total of 873 locomotives in service on the road, 373 or 42.7% were classed as "standard" and, by 1900, it was pretty well completed. Curiously enough, in the 1903 Locomotive Register, there appears amongst the P. B. & W. locomotives, an old 4-4-0 built by Baldwin in 1859. The road evidently found use for this "old timer" on one of its branches. The standardization was carried out under carefully conceived conditions and the size of the system made it possible to assign locomotives too light for main line service to other sections where they would be of value.

In designing these first eight standard classes, an effort was made to have interchangeable details as far as possible, with the view of reducing the cost of repairs and increasing the availability of the locomotive, rather than producing something radically new and different. Here, it was very successful, the locomotive rendered excellent service, and the interchangeable details were incorporated to an unusual extent. All burned bituminous coal.

These eight classes were designated by the first eight letters of the alphabet. By 1898, the supply of letters had been exhausted and there were some differences in the locomotives assigned the same letter. The new system, the one still in use, assigned one letter to each wheel arrangement and this was followed by a number and sometimes a letter to indicate the different classes having that wheel arrangement. The old locomotives were reclassified on that basis and, for convenience in this chapter, the new classification will be given in parentheses in order that they may be more easily identified.

The main characteristics of these first eight classes were as follows:

Class A(D-1)—A 4-4-0 type locomotive for express passenger service with 17x24″ cylinders and 68″ drivers. First one built was P. R. R. No. 54, A. M. S. No. 7, 9/1868.

Class B(D-2)—A 4-4-0 type locomotive for mountain passenger helper service with 18x24″ cylinders, 62″ drivers, boiler similar to that used on Class A but with larger firebox. First one built was P. R. R. No. 136, A. M. S. No. 18, 4/1869.

Class C(D-3)—A 4-4-0 type locomotive for general passenger or fast freight service with 17x24″ cylinders, 62″ drivers, boiler same as on the Class B. First one built was P. R. R. No. 106, A. M. S. No. 28, 6/1869.

Class D(G-1)—A 4-6-0 type locomotive for general freight service with 18x22″ cylinders, 56″ drivers. First one built was P. R. R. No. 154, BLW No. 1744, 7/1868.

Class E(G-2)—A 4-6-0 type locomotive for freight service on mountain grades with 18x22″ cylinders, 50″ drivers and boiler similar but larger than the one used on Class D. First one built was P. R. R. No. 123, A. M. S. No. 22, 5/1869.

Class F(B-1)—An 0-6-0 tank locomotive for switching service with 15x18″ cylinders and 44″ drivers. First one built was P. R. R. No. 129, A. M. S. No. 40, 11/1869.

Class G(D-5)—A 4-4-0 type locomotive for light passenger service with 15x22″ cylinders and 56″ drivers. First one built was P. R. R. No. 89, A. M. S. No. 68, 11/1870.

Class H(B-2)—An 0-6-0 switching locomotive with separate tender having 15x22″ cylinders and 44″ drivers. First one built was P. R. R. No. 781, A. M. S. No. 146, 10/1872.

The records show that Classes C(D-3), D(G-1) and E(G-2) were built in greater numbers than any of the others while Classes A(D-1) and B(D-2) were built in limited numbers. Some of the Class D(G-1) engines were subsequently built with 50″ drivers or else these drivers

were substituted for the larger and these were classified as De(G1a). Some of these, upon transfer to the P. Ft. W. & C., were classified as G-2 tho' there were some differences from the regular G-2 design. One might well be surprised at the size of the cylinders of the Class G(D-5) locomotives. During the Civil War the 16″ cylinder locomotive had pretty well come into its own and had shown great versatility in both freight and passenger service. To the writer, 15″ cylinder passenger locomotive for 1870 seems a step backward, but there were only eighteen of these engines constructed and perhaps the service warranted the creation of this class with these small cylinders.

To these first eight classes there was added in 1873 a 4-4-0 type locomotive for burning anthracite, designated as C anthracite (D-4), generally similar to the Class C, that were designed for service on the lines in New Jersey. In 1875 a number were built with 68″ drivers, designated as Class Ca Anthracite (D-4a). The first class C anthracite was P. R. R. No. 912, A. M. S. No. 190, 6/1873. These locomotives were placed in fast passenger service on the New York Division (Philadelphia to Jersey City) where they successfully handled the traffic until 1881. Another class added was the Class I(H-1), a 2-8-0 type freight locomotive, with 20x24″ cylinders, 50″ drivers and the first one built was P. R. R. No. 113, A. M. S. No. 271, 4/1875.

James Dredge, in his book—"The Pennsylvania Railroad," published in London, 1879, presents a table showing the extent of the interchangeability of castings used on these ten classes of locomotives that is reproduced herewith:

Number of Castings	Common to Classes	Number of Castings	Common to Classes
26	A to I	1	G, F, H
15	A to E	15	D, E
14	A to C	7	B, D, E
16	A, C	1	E, G
6	A, B, D, E, G	2	D, E, F, H, I
6	A, B, C, D, E, I	3	D, E, G
6	A, B, C, G	1	E, H
6	A to H	2	D, E, G, H, I
5	A, B, C, D, E, G	1	I, C
3	A, B, C, D, E, G, I	1	D, E, I
3	D, G	24	F, G, H
1	B, C, H	4	G, H
1	A, D, F, G	5	F, H
1	C, E	1	F, G

The number of forgings used in each locomotive averaged 245, and with few exceptions, these were identical in Classes A, B, C and D. There was greater variety in the other classes, especially in the Class I, the consolidation. For the ten different classes, the maximum variation was only four different patterns of brass or iron castings for any given part.

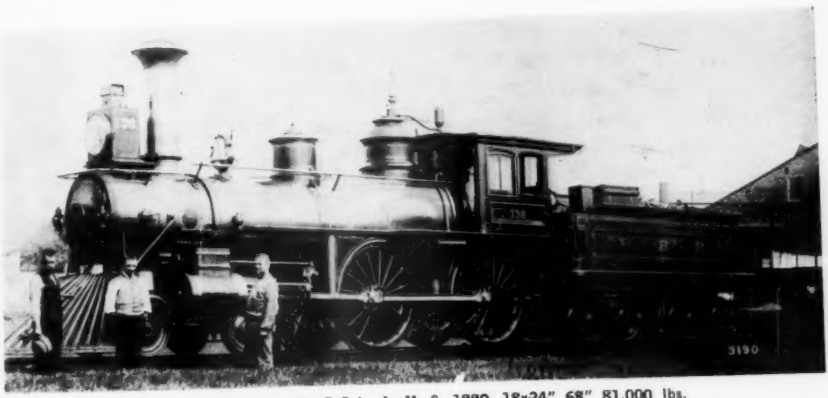
Classes A to E all had wagon top boilers, dome over the firebox and the latter was placed between the main and rear drivers except in the C anthracite which had a long firebox extending over the rear driving axle. The crown sheets were flat and stayed by crown bars. Brick arches, supported on water tubes were used on the bituminous coal burning passenger locomotives and each boiler was fed by one pump and one injector. The Stephenson link motion was used and on the ten-wheel freight engines, the rocker arms were placed in front of the first pair of drivers and the eccentric rod bent to clear the first axle. Crossheads were of iron and worked in a four bar guide.

All of these classes had a short smokebox and were fitted with various designs of stacks. The bituminous coal burning passenger engines used a "Smith" design, a straight stack with a basket-shaped spark arrester extending from the top of the exhaust nozzle up inside the stack. The freight and switching locomotives used a diamond stack altho' the (Laird) and Smith designs were used on some of the first ten-wheelers. Some of the first anthracite burning passenger engines had diamond stacks but these were soon replaced by straight stacks. These straight stacks were extremely neat looking with their cast iron bases and tops and either in their original form or simplified design, they were used for many years.

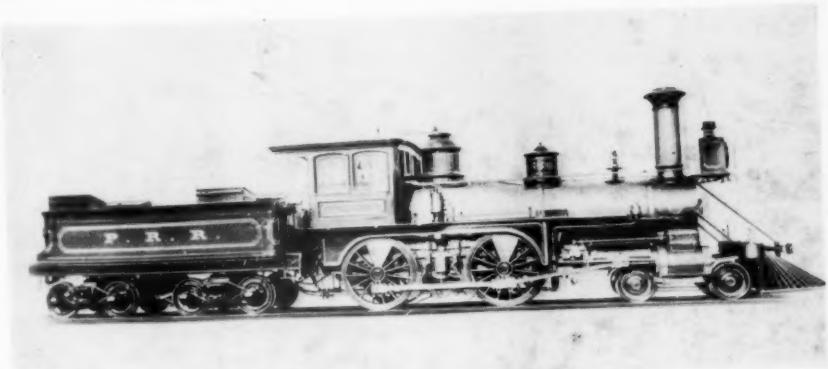
The boiler of the Class I(H-1) was known as the "Altoona type" and differed from the other classes. The barrel had a straight top and the dome was over the front of the firebox. The crown and roof sheets sloped towards the rear at a rather steep angle with a narrowing space between them that was almost entirely filled with water. Both sheets were flat and stayed with screw stays. The grates were composed of water tubes and two longitudinal bars which could be dropped when the fire needed cleaning. This arrangement was also used on the other classes. These Class I(H-1) locomotives were a wonderful locomotive for their day. They were built in large numbers and in the years that followed when the demands exceeded their capacity, many were rebuilt on the Lines West by removing the rear pair of drivers and the leading truck. Reclassified as B-5, these switchers could negotiate a sharper curve than the B-3's and there were a fair number of these in service at one time.

Although these Class I(H-1) engines were the first "consols" built at Altoona, they were not the first of that type to be placed in service. In June, 1868, the Baldwin Works completed under their construction No. 1729, P. R. R. (P&E) No. 1092 with 20x24″ cylinders, 49″ drivers and a weight of 34 (long) tons. A similar locomotive was completed 4/1870 under construction No. 2125, road number P. R. R. (P&E) No. 1111. Three more followed in 10/1870, road numbers P. R. R. (P&E) 1114-1116. In 1873, the Baldwin Works delivered to the P. R. R. Nos. 950-953 and five to the P & E, Nos. 1146-1150. These had wagon-top boilers, iron shells, steel fireboxes, water tube grates and variable exhaust nozzles.

P. R. R. #925, Class B(D-2), A. M. S. 1873. 18x24" 62" 78,200 lbs.



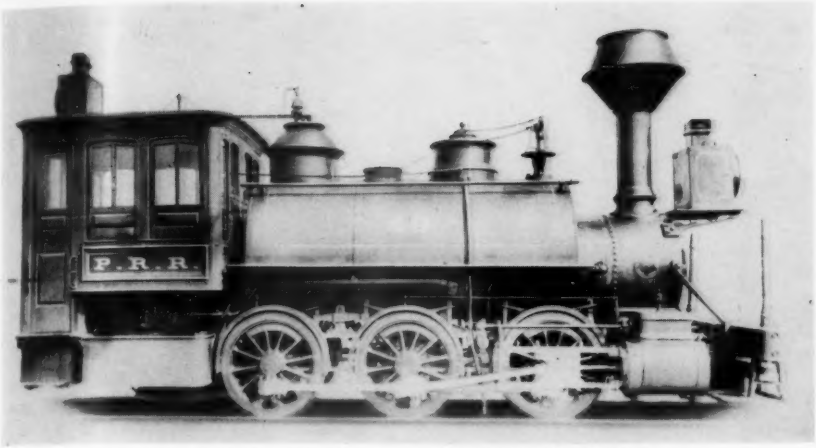
P. R. R. #138, Class Ba(D-2a), A. M. S. 1882. 18x24" 68" 81,000 lbs.



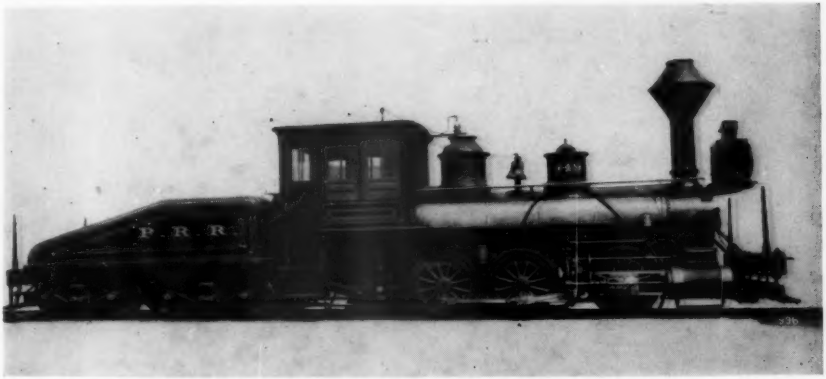
P. R. R. #658, Class C Anth (D-4), A. M. S. 1875. 17x24" 62" 79,760 lbs.

P. R. R. #41, Class C(D-3), A. M. S. 1876. 17x24" 62" 75,700 lbs.

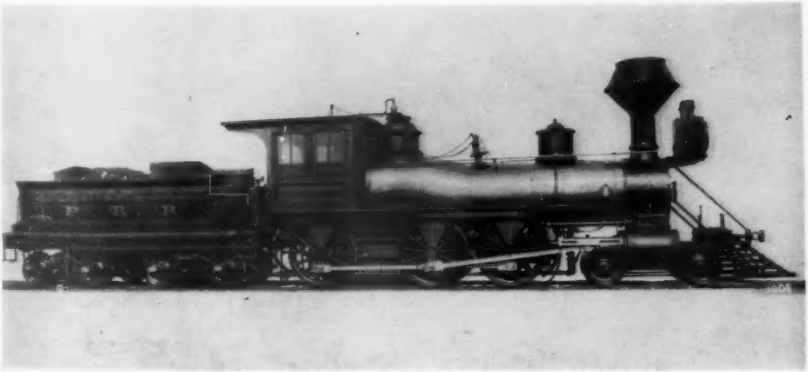
P. R. R. #1330, Class P(D-12a), A. M. S. 1889, on Pennsylvania Limited on Middle Division.
18½x24" 68" 106,500 lbs.



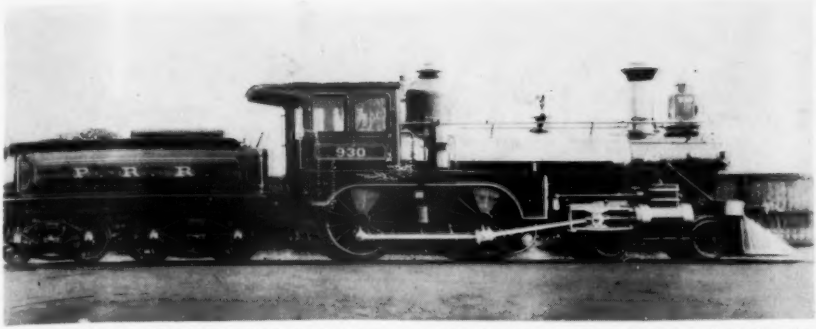
P. R. R. #48, Class F(B-1), A. M. S. 1869. 15x18" 44" 68,900 lbs.



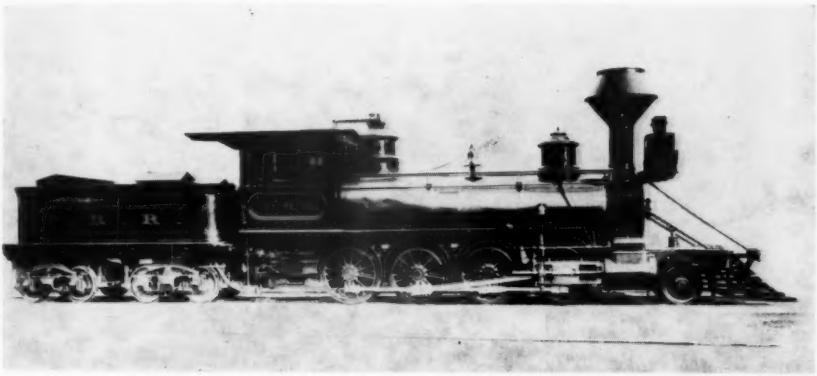
P. R. R. #949, Class H(B-2), A. M. S. 1873, 15x22" 44" 64,700 lbs.



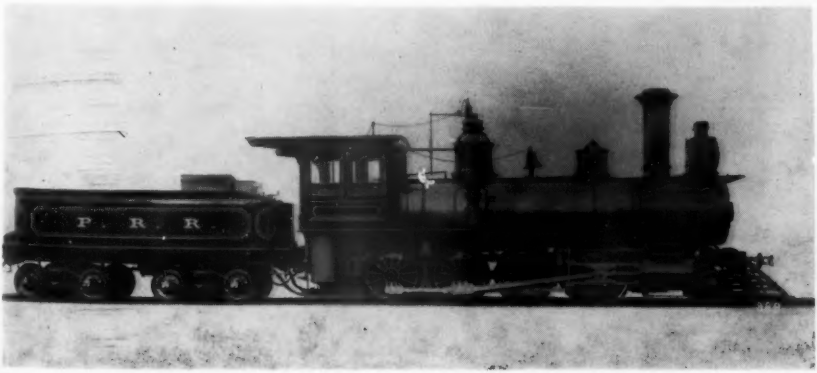
P. R. R. #489, Class D(G-1), A. M. S. 1871. 18x22" 56" 79,800 lbs.



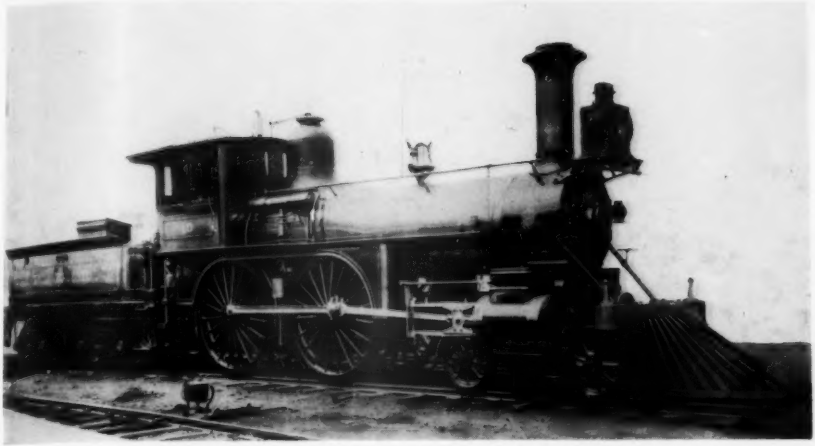
P. R. R. #930, Class G(D-5), A. M. S. 1873. Shown as rebuilt for special service. 15x22" 56" 63,450 lbs.



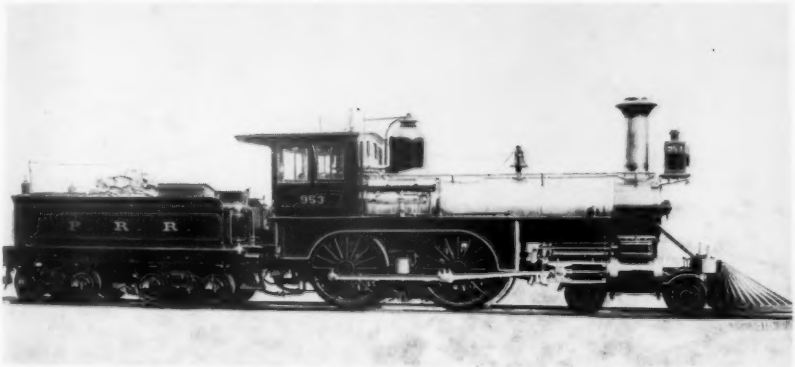
P. R. R. #950, Baldwin 1873. One of the early consolidation class. 20x24" 49" 96,000 lbs.



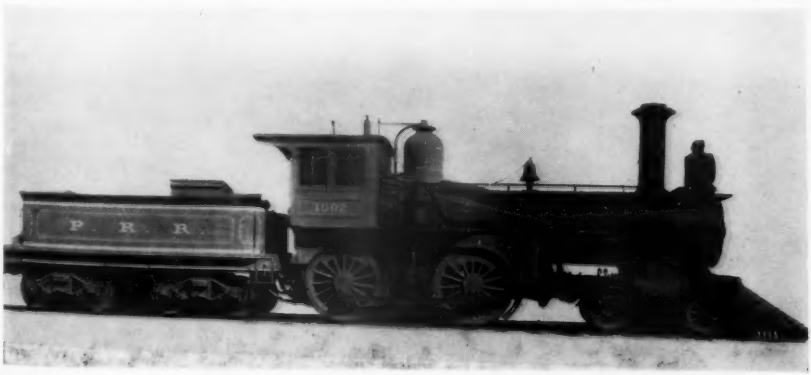
P. R. R. #433, Class I(H-1) A. M. S. 1881. 20x24" 50" 97,500 lbs.



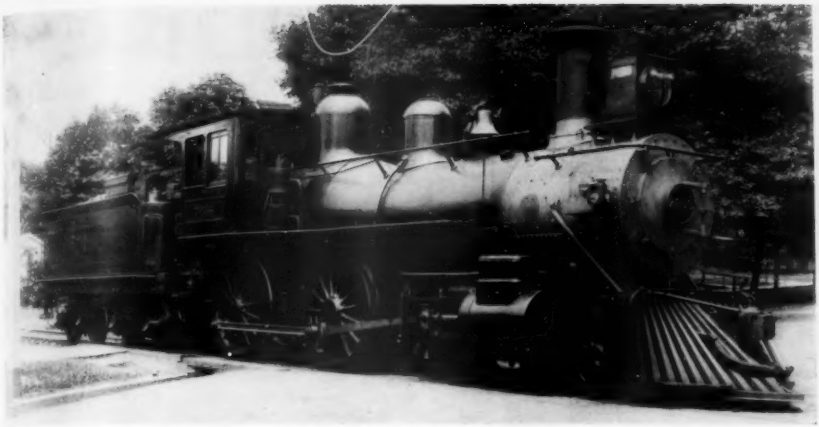
P. R. R. #10, Class K(D-6) A. M. S. 1881. 18x24" 78" 92,700 lbs.



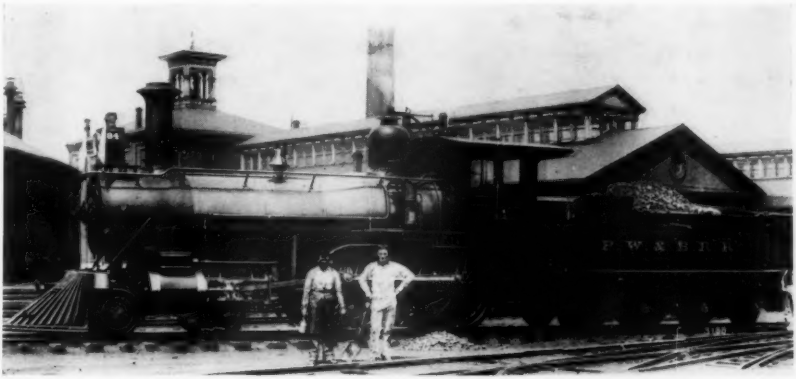
P. R. R. #953, Class A Anth (D-7), A. M. S. 1882. 17x24" 68" 92,800 lbs.



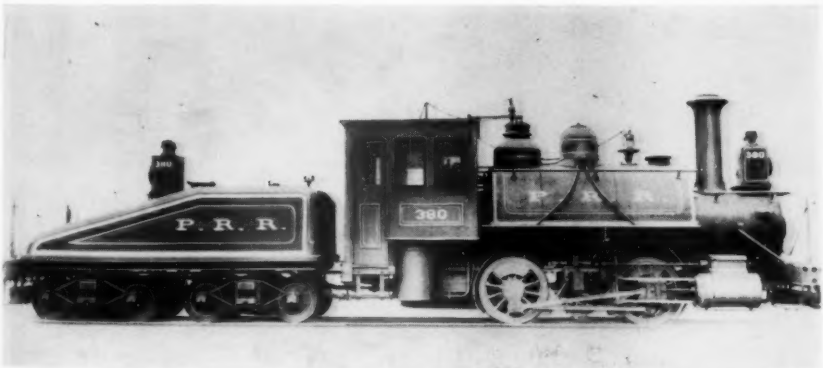
P. R. R. #1002, Class N(D-8), A. M. S. 1883. 17x24" 62" 91,300 lbs.



Pa. Lines #7606, Class O(D-8a), A. M. S. 1888. 18x24" 62" 95,000 lbs.



PW&B #84, Class P(D-11a), A. M. S. 1886. 18½x24" 68" 100,600 lbs



P. R. R. #380, Class Q(A-2), A. M. S. 1885. 15x24" 50" 72,000 lbs.

Of the passenger locomotives, the Class C engines were the main "work horses." By 1870, the road had commenced the use of track pans and this permitted fewer stops for water. By means of them and extra bags of coal carried, the No. 573, Class C(D-3) was able to handle the Jarrett and Palmer special, a theatrical train, from Jersey City to Pittsburgh on June 1, 1876, non-stop, covering the distance of 438.5 miles in 10 hours and 5 minutes, an average of 43.5 miles an hour.

Mention here should be made of the use of the Westinghouse Air Brake. The first tests were made on September 18th, 1869 and the first new cars to be equipped with it were completed in May, 1870. These first air brakes were the straight air type, the automatic feature had not yet been developed. These were not tried until October, 1875 and they were adopted as standard in 1878. The first new cars to be equipped with this type of brake were a number of postal cars built in May of that year at Altoona.

Mr. A. J. Cassatt was Superintendent of Motive Power and Machinery from November 16, 1867 to April 1, 1870. The designs of these early standard locomotives were prepared by John B. Collins, Mechanical Engineer, 1866-1886. Mr. Cassatt was followed by Isaac Dripps, George Clinton Gardner and Frank Thompson, each serving short terms and, on July 1, 1874, Theodore N. Ely was appointed Superintendent of Motive Power of the Pennsylvania R. R. and the United Railroads of New Jersey. In 1882, Mr. Ely's jurisdiction was extended to cover all of the lines east of Pittsburgh and from 1893, to the date of his retirement in 1911, he served as Chief of Motive Power of the lines East and West of Pittsburgh, with office at Philadelphia.

It was during Mr. Ely's administration at Altoona that the increasing freight and passenger traffic posed new problems of locomotive design. Larger locomotives of the American and Consolidation types were favored over all others and these were not only increased in size but they showed a marked increase in efficiency with a refinement of detail and symmetrical outline. The old "hit or miss" methods were discarded; designs and specifications were prepared and tests were conducted on a scientific basis. The motive power department ceased to exist as shop adjunct and assumed its rightful place of importance. In this connection, the motive power department, generally employs more men and its officers have more responsibility than other departmental officers and, it can be the means of saving as much or more money than the other officers. Its "chief" usually reports to an operating department official who is not always qualified or capable of rendering a fair decision with the result the road suffers. Our American railroads might well go to England and study their method of organization. There, the motive power department has come into its own. If Mr. Ely used care in the selection of materials, he also used care in the selection of his assistants and they, with their "chief," placed the department on the high plane it has since occupied.

During the first years of the Ely administration, the locomotives of his predecessors capably carried out their assignments but, traffic on

the New York Division was increasing rapidly. In June of 1880, P. R. R. No. 2, A. M. S. No. 456 was placed in service. This was an enlarged Class C anthracite with 19x24″ cylinders, 68″ drivers and was classified as "K" and appears as such in the 1884 register. This was the only one built and the engine was retired prior to 1898.

The first locomotive of the well-known Class K(D-6) was P. R. R. No. 10, A. M. S. No. 532, 3/1881. The locomotives of this class had 18x24″ cylinders, 78″ drivers and carried a pressure of 140 lbs. as against the 125 lbs. pressure carried by the previous standard locomotives. They burned anthracite, had wagon-top boilers, firebox above the frames and had a grate area of 34.7 square feet. The earlier engines had short front ends with horizontal frame rails between the drivers but the later engines had extended front ends and a deeper firebox throat by sloping the top frame rail and the fire-box mud ring.

These locomotives were very symmetrical and clean cut in their appearance. Two sand boxes, placed under the running boards and inside the wheel covers contributed to this and the dome casing was hemispherical without beading or fancy moulding. They were fitted with two-bar guides and alligator type cross-heads instead of the four-bar guides on the previous passenger locomotives. The main rods were of a rectangular section, the side rods of an I-section. The width of the firebox prevented placing the springs above the driving boxes so, they were underhung and connected by equalizers on each side. This worked out very well and was applied to all 4-4-0 types built subsequently with fireboxes above the frames.

Perhaps the most interesting feature was the power reverse gear which was devised to handle the unbalanced slidevalves carrying a pressure of 140 pounds. Bolted to the boiler and placed immediately in front of the right side of the cab, this reversing gear consisted of two cylinders with the pistons mounted on the same rod. This rod was connected at its middle point to a rocking lever the lower end of which was pinned to the reach rod. Steam was admitted to either end of the forward cylinder, according to the direction in which the gear was to be shifted, while the rear cylinder was filled with oil that functioned as a locking device for holding the gear in position. This mechanism was controlled by a hand lever in the cab that was so arranged that when steam was admitted to shift the gear, a valve was opened to permit free communication between the two ends of the oil cylinder. This device worked satisfactorily but, when balanced slide valves were subsequently adopted, it was abandoned. With a five car train of around 125 tons in weight, these locomotives could travel the 88½ miles between West Philadelphia and Jersey City in one hour and 55 minutes making three intermediate stops, with little difficulty.

In May, 1881, P. R. R. No. 95, A. M. S. No. 539, Class Ba(D-2a) was placed in fast passenger service. The design was based on the B(D-2) Class but 68″ drivers were substituted for the 62″ drivers of the Class B. Other than an extended smoke box, they were very similar in appearance to the Class A.

The success of the Class K(D-6) locomotives led to a similar design with 17x24″ cylinders, 68″ drivers and P. R. R. No. 81, A. M. S. No. 686, 8/1882 was the first Class A anthracite (D-7) to be delivered.

The road experimented with a "double-ender" or forney in the construction of P. R. R. No. 4, A. M. S. No. 645, 3/1882, with 17x24″ cylinders, 62″ drivers and a total weight of 124100 pounds. With a wheel arrangement—2-4-6T, this locomotive was Class L but was scrapped prior to 1895 when the same letter was assigned locomotives of the 4-4-0 type.

Towards the end of the year, P. R. R. No. 212, A. M. S. No. 705, 9/1882, 0-6-0 type, Class M(B-3) was delivered. These engines with their box cabs, extended front ends, "Altoona" boilers like on the Class I(H-1), 19x24″ cylinders, 50″ drivers were a sturdy addition to the growing fleet of switching engines.

The year 1883 brought forth three new designs to meet the increasing requirements of passenger service, all American or 4-4-0 type:

Class N(D-8)—A 4-4-0 type locomotive with 17x24″ cylinders, 62″ drivers, 125 lb. pressure, first engine built was P. R. R. No. 995, A. M. S. No. 800, 6/1883.

Class O(D-8a)—A 4-4-0 type locomotive with 18x24″ cylinders, 62″ drivers, 130 lb. pressure, first engine built was P. R. R. No. 1047, A. M. S. No. 810, 7/1883.

Class P(D-11a)—A 4-4-0 type locomotive with 18½x24″ cylinders, 68″ drivers, 140 lb. pressure, first engine built was P. R. R. No. 1056, A. M. S. No. 834, 8/1883.

Class N was rebuilt to replace the old Class C(D-3) and the Class O was to replace the Class B(D-2) locomotives. Class P(D-11a) was a hard coal burner, heavier and more powerful than any class placed on the road. They were designed for the fast, heavy trains on the New York Division and their success led to their adoption on other divisions where bituminous coal was used. All designs closely resembled those of the Class K(D-6) and all were improvements over their predecessors.

This year, 1883, saw control of the Camden & Atlantic R. R. pass to that of the Pennsylvania. This road, together with the West Jersey R. R. which had been acquired in 1871, gave the Pennsylvania R. R. access to the Southern New Jersey coast resorts and the traffic requirements of these lines influenced certain future motive power requirements.

If the passenger locomotives had difficulty meeting the growing traffic requirements, you may rest assured that the Class I(H-1) freight engines were having the same trouble. The first of a new class of consolidations was P. R. R. No. 400, A. M. S. No. 983, 10/1885, Class R(H-3), with 20x24″ cylinders, 50″ drivers, steam pressure 140 lb. with an increase in tractive effort of 12% over the Class I. The boiler was of the Belpaire pattern, first to be used on this road and a boiler that became standard up to the very end of the use of steam locomotives. The boiler had a straight top, dome placed ahead of the firebox, roof and crown sheets horizontal, firebox above the frames and rocking grates instead of the water grates applied to the earlier consolidations.

These locomotives proved highly successful, they were built in large numbers and with some variations which gave rise to several subclasses. In 1891, the Baldwin Works built five fitted with Vauclain compound cylinders. In later years, some were rebuilt to six-wheel switchers by the removal of the rear pair of drivers and "pony" truck, Class B-7 or B-7a. The late Charles B. Chaney, in our Bulletin No. 68 gave an interesting and accurate account of these engines and their variations that need not be repeated here. Probably no class of freight engines served so many subsidiary roads as did the H-3 and the sub-classes, for some of these engines carried as many as seven numbers during their life time.

The year following, the Class S(H-2a) were built for the Lines West in the Fort Wayne Shops of the P. Ft. W. & C. Ry. These locomotives closely followed the specifications of the Class R(H-3) but, they used a crown bar boiler and they were lighter. The first record we have of this class being constructed is July, 1886, when P. Ft. W. & C. Nos. 220 and 232 were completed in the Fort Wayne Shops. For two years the crown bar boiler was continued but in July, 1888, the first Belpaire boiler was applied to an order of engines from the Baldwin Works and these were subsequently classified as H-2. The class S locomotives were used exclusively on the Lines West and were built in both the Fort Wayne and Columbus Shops. Like the Class R, some were rebuilt to six-wheel switchers and reclassified as B-5a and a few only had their "pony" trucks removed and were reclassified as C-29. In 1887, the first of this class built at Altoona was A. M. S. No. 1117, 3/1887, S. W. S. (P. C. & St. L.) No. 5.

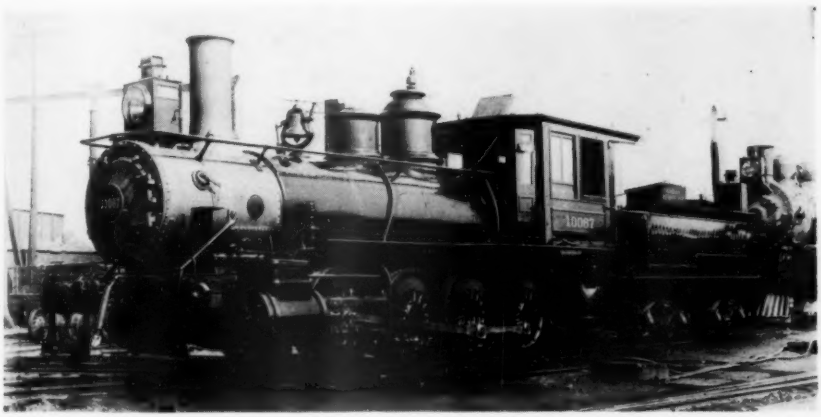
To serve the docks and market sections of Philadelphia, the road designed the Class Q(A-2), an 0-4-0 type switcher with 15x24″ cylinders, 50″ drivers and P. R. R. No. 189, A. M. S. No. 975, 6/1885 was the first one delivered. Some were built with 44″ drivers, reclassified A-1 and many of these engines were built in the shops at Wilmington, Delaware.

On March 1, 1887, Alex S. Vogt was appointed Mechanical Engineer at Altoona. Mr. Vogt succeeded John W. Cloud who had filled the position since the death of Mr. Collins on March 20, 1886. For thirty years Mr. Vogt capably filled this office and during this period he improved the design and the efficiency of the locomotive.

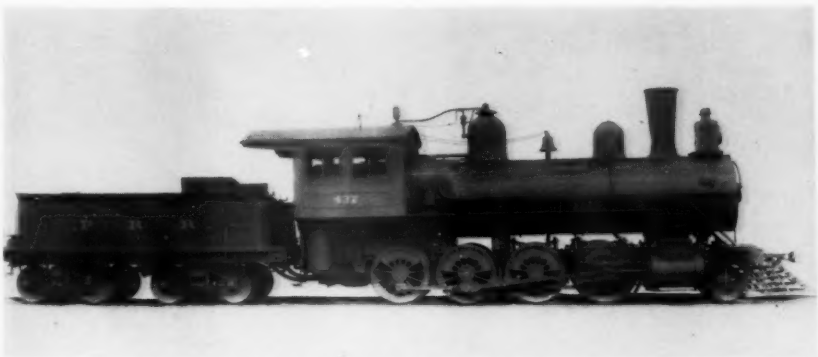
It was in the month of May, 1887 that the road decided to run a test on a locomotive with the idea of establishing a mileage record. The locomotive selected was A. M. S. No. 992, Class P(D-11a), 12/1885. Built originally as Baltimore & Potomac No. 317, it was renumbered Philadelphia, Wilmington & Baltimore No. 175 and, on a special schedule, it made two round trips daily between Philadelphia and Washington. The mileage covered during the 31 days the test was conducted amounted to 17,360 miles.

Another experiment was conducted during the year by Dr. Charles B. Dudley, Chief Chemist, to determine the value of petroleum as a fuel. A locomotive was equipped for this purpose on the Pittsburgh Division and the tests proved that it was practicable and that one pound of oil was the equivalent in heating value to 1¾ pounds of coal. When

P. R. R. #504, Class M(B-3), A. M. S. 1882. 19x24" 50" 91,700 lbs.



Pa. Lines #10067, Class I(H-1, C-29), Ft. Wayne 1888. 20x24" 50" 104,500 lbs.

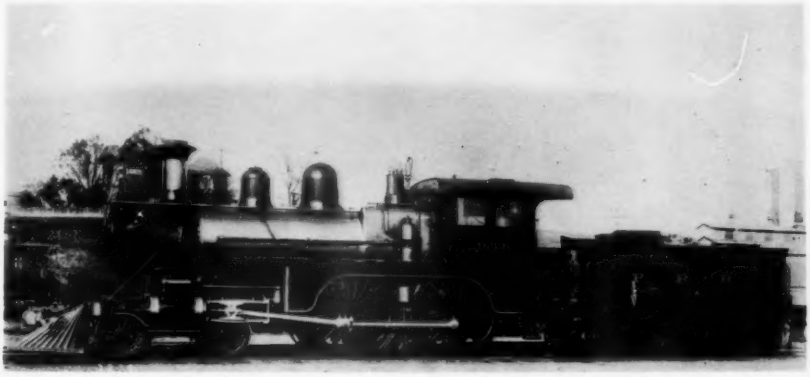


P. R. R. #437, Class R(H-3), A. M. S. 1886. 20x24" 50" 114,620 lbs.

P. R. R. #568, Class O(D-10a), A. M. S. 1891, Crossing Susquehanna River with the Pennsylvania Limited. 18x24" 68" 103,500 lbs.

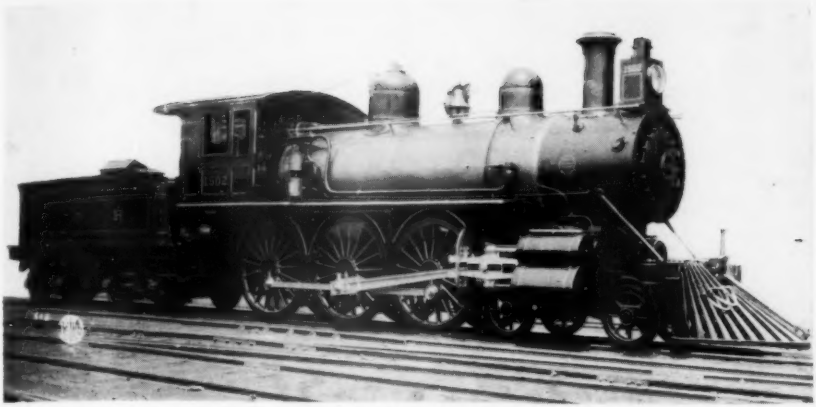
P. R. R. #5180, Class P(D-13a), A. M. S. 1892. 18½x24" 68" 112,200 lbs.

P. R. R. #1392, Class P(D-13c), A. M. S. 1890, on Philadelphia Division. 18½x24" 68" 114,500 lbs.

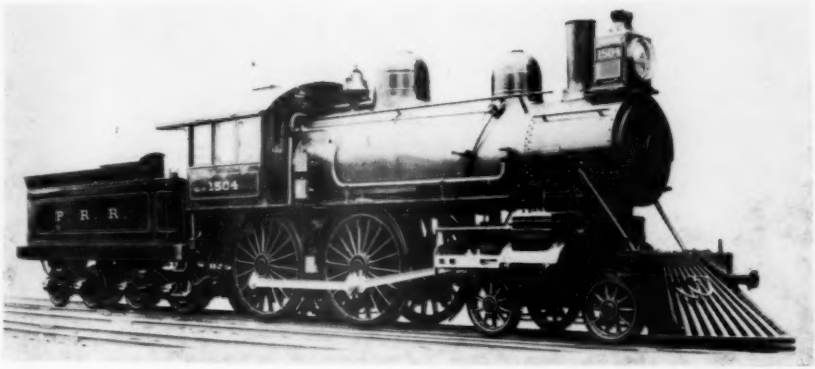


P. R .R. #1659, Class P(D-14) Juniata, 1893. 18½x24" 78" 122,600 lbs.

P. R. R. #1510, Baldwin 1892. 13&22x24" 78" 122,400 lbs.



P. R. R. #1502, Baldwin 1892. 14&24x24" 72" 132,000 lbs.



P. R. R. #1504, Schenectady 1892. 19x24" 78" 126,700 lbs.

P. R. R. #1503, Schenectady 1892. 20&30x24" 74" 143,000 lbs.

the costs were figured for the eastern section, they were found to be prohibitive but the tests furnished the ratio between the two fuels and demonstrated the fact that oil could be burned with safety and efficiency in a locomotive firebox.

In 1888 the road purchased and imported a locomotive from Beyer, Peacock & Co., England. It was a three cylinder locomotive similar to those used on the London & Northwestern Ry., designed by F. W. Webb, their Locomotive Superintendent. The two high pressure cylinders were outside and their pistons connected to the rear pair of drivers. The low pressure cylinder was connected with the first pair of drivers which used a crank axle. Since the drivers had no side rods, I suppose, strictly speaking, the locomotive was of the 2-2-2-0 type but it is generally referred to as a 2-4-0. The road had to apply a pilot and the English cab was replaced by one applied at Altoona and standard couplers had to be applied. For nearly ten years this locomotive was tried out on various passenger jobs and altho' it was a well built locomotive, it lacked the necessary tractive effort and was discarded.

In 1889 the design of the Class O locomotives was revised to include a Belpaire boiler carrying 160 lb. pressure and 68″ drivers. These were reclassified D-9a and the first one built at Altoona was A. M. S. No. 1430, N. W. S. (P. Ft. W. & C.) No. 114, 10/1889. These locomotives were used exclusively on the Lines West and in addition to those built at Altoona, the shops of the Lines West supplemented their needs.

In a similar fashion, the Class P engines were improved by the substitution of the Belpaire boiler for the crown bar type and increasing the pressure to 160 lb. These were reclassified as D-12a and the first one built was A. M. S. No. 1413, P. R. R. No. 1321, 8/1889.

In 1890, the Class O design was further revised to include a 3″ larger Belpaire boiler with two sizes of drivers. Those with 62″ were reclassified as D-10; those with 68″, D-10a. The first D-10 was A. M. S. No. 1496, Northern Central No. 131, 5/1890 while the first D-10a was N. W. S. (P. Ft. W. & C.) No. 153, A. M. S. No. 1501, 5/1890. The D-10 engines were assigned the Middle Division with a river grade while the D-12a class were assigned the Philadelphia and Pittsburgh Division where the grades were more severe.

With the view of improving the repair facilities at Altoona, the Juniata Shops were constructed at East Altoona. With a capacity of building 150 locomotives annually, equipped with the latest electric and hydraulic machinery, these shops represented a great addition to the motive power plant. The Altoona Machine Shops continued to build new locomotives until January, 1904, but in limited numbers; and these shops henceforth were devoted to repair work. Juniata Shops built chiefly new locomotives and shop number 1, P. R. R. No. 692, new classification H-3a, left those shops in July, 1891 to be followed by 137 like her.

Traffic continued to grow on the New York Division—Philadelphia to Jersey City. In 1892 the Pennsylvania ordered two locomotives from both the Baldwin and Schenectady Works and constructed one Class T(D-15) at Altoona. Their dimensions were as follows:

PRR #			C	D	P	WD	WE	TE
1502	Baldwin	4-6-0	14&24x24″	72″	180#	101,300	132,000	16,500
1503	Schenectady	4-6-0	20&30x24″	74″	180#	106,000	143,000	15,000
1504	Schenectady	4-4-0	19x24″	78″	180#	81,500	126,700	17,000
1510	Baldwin	4-4-0	13&22x24″	78″	180#	83,900	122,400	12,900
1515	Altoona	4-4-0	19½&31x28″	84″	205#	95,200	145,500	20,800
							Class	T(D-15)

Both Baldwin engines had Vauclain compound cylinders, the Schenectady ten-wheeler was a cross compound while their eight-wheeler had single expansion cylinders. The Altoona-built locomotive was a Lindner cross compound and its low running boards and wheel covers gave it a British appearance. These five locomotives were tried on different divisions and different runs. The No. 1515 was assigned the "Pennsylvania Limited" on the New York Division and was photographed by Blauvelt while handling that train. It would seem as though this engine was not properly balanced in that one side developed more power than the other with resulting main rod failures. She was replaced in 1904 with a new engine and Nos. 1502 and 1503 evidently were dropped from the records about the same time. Nos. 1504 and 1510 appear in the 1911 classification and were on the eastern end of the road. None of these designs were duplicated.

In 1892 slight modifications were made to the Class P locomotives that resulted in a separate class when the new classification was adopted. The first Class P(D-13a) was P. W. & B. No. 8, A. M. S. No. 1754, 6/1892, with 68″ drivers. A further modification was made in 1893 and some locomotives had 68″ drivers and others had 62″ drivers.

The Class M(B-3) design was improved by the substitution of a Belpaire boiler, increase in steam pressure to 160 lb. and A. M. S. No. 1766, P. R. R. No. 828, 6/1892 was the first of these locomotives built, reclassified as B-4. The year following the firebox was increased in size, new classification B-4a and A. M. S. No. 1883, P. W. & B. No. 10, 8/1893 was the first of this class.

In July of 1893, the Juniata Shops completed six locomotives of a modified Class P(D-14) design. Three were assigned the New York Division and three were built for the P. W. & B. The most important changes were the increase in drivers from 68 to 78 inches and, altho' this resulted in a decrease in tractive effort, they were a distinct improvement for fast passenger service. The sand dome was placed atop the boiler and, with their capped stacks, Russian iron jackets, in the opinion of this author, they were the handsomest 4-4-0's used on this road. The first locomotive of this group was Juniata No. 249, P. R. R. No. 1658, 7/1893.

The year following the design was again modified and these engines were subsequently classified as D-14a. The boiler dimensions had proven ample so, the cylinders were increased from 18½″ to 19″, the valve gear redesigned and, by using a 4″ steel tire, the diameter of the drivers was increased to 80″. The handsome cap stack was replaced by an ugly cast iron taper stack and a round case headlight was mounted on top of the boiler. After a thorough trial, these last two features were found wanting and replaced with standard equipment. Juniata No. 315,

P. R. R. No. 804, 7/1894 was the first one built. These engines gave good service on the New York Division but, upon the arrival of the Class L(D-16), they were renumbered and assigned the P. W. & B., (Maryland Division).

The last, and probably the best of the many designs of the 4-4-0 type that originated on this road was the Class L(D-16) and the various sub-classes. They appeared while F. D. Casanave was Gen'l Sup't of Motive Power, Lines East from March 1, 1893 to October 1, 1901. They were designed to develop the maximum power within the weight limitations. With 18½x26″ cylinders, 68″ drivers, pressure increased to 185 lb. these locomotives were built for service on the divisions with the heavier grades. The locomotives with the 80″ drivers (D-16a) were used on the level divisions. A box shaped guide, which originated with Mr. Vogt, was used, but the difference between this and the Dean slide used years previously on the Old Colony R. R. is very slight. This guide, open on the bottom, made in two pieces was held together by six horizontal bolts. The reduction in weight of the reciprocating parts of the Class L over the Class P was nearly 100 pounds.

The boilers were of the Belpaire type and were tapered from a 60″ diameter at the smoke box to 68″ at the dome ring. The original design called for horizontal crown and roof sheets but the design was modified to provide for a sloping of both at a moderate angle towards the rear. They were a well designed locomotive and they gave wonderful service. The following is a record of the first ones built.

Juniata	#346,	P. R. R.	#88,	5/1895—first Class L(D-16a)
Juniata	#376,	P. R. R.	#206,	1/1896—first Class L(D-16)
Juniata	#565,	P. R. R.	#468,	2/1899—first Class D-16c
A.M.S.	#2128,	P. R. R.	#178,	6/1900—first Class D-16b
Juniata	#725,	C. & P.	#603,	10/1900—first Class D-16d

The last three classes had the sloping crown and roof sheets.

A record was made by P. R. R. No. 816, D-16a built by Juniata 11/1895, when that locomotive ran three years and four months on the Middle Division before it was sent to the shops for what is now classified repairs. During that time it rolled up the impressive mileage of 305,037 miles nor had the tires been turned, valves faced, cylinders bored, valve gear overhauled or flues removed. And, I might add, the other engines were just as good. Despite the fact that heavier engines were designed in the years that followed, these D-16 engines were built in Juniata Shops as late as 1910. It might be well to add at this point, with the advent of superheated steam the majority of these locomotives were furnished with new cylinder castings, the diameter of which was increased to 20½″. The majority of them, at that time, were given 68″ drivers and classified as D-16sb. As such, they were ideally suited for suburban service and many a time the author has ridden behind them with trains of five and six suburban steel coaches. They could accelerate quickly and run fast between the stops—the superheater gave new life and new uses to these engines and it is a satisfaction to learn that the road has preserved one of them. One of the locomotives

of this class was in service as late as 1942. Comparisons sometimes amount to but little but of all the American type locomotives built in this country, the Class D-16 of the Pennsylvania R. R. deserves mention and consideration.

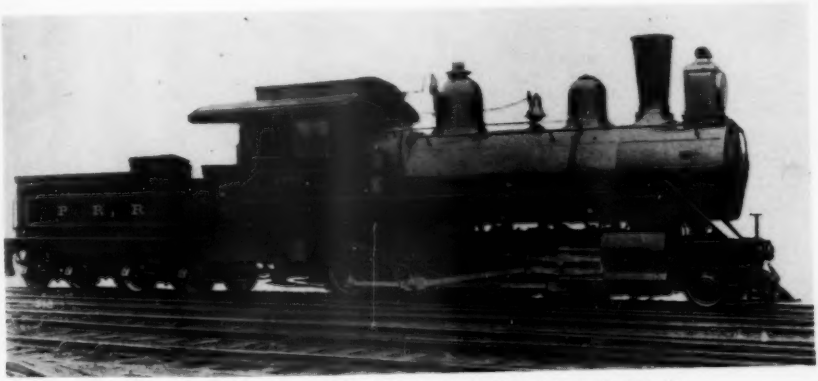
While the road was developing and improving the American type, other types of locomotives had not passed unnoted. In 1892, the Fort Wayne Shops of the P. Ft. W. & C. Ry. constructed the first of a group of Class X(G-3) locomotives to enable them to handle better their growing passenger service. These locomotives had 19x24″ cylinders, 68″ drivers with a total weight of locomotive of 146,500 lbs. The No. 267 was the first one constructed and, a year later, the No. 279 with 62″ drivers, reclassified G-3a was built. With their Belpaire boilers and mountings, they closely resembled the D-14 class and they were not only handsome but they turned in a very fine performance.

Class U(A-3), Juniata Shop No. 331, P. W. & B. No. 6, 1/1895 was designed to replace the Class Q(A-2) locomotives. These had 17x24″ cylinders, 50″ drivers, Belpaire boilers and a weight of 82,300 lbs. In 1901 the design was modified and these later engines were class A-3a.

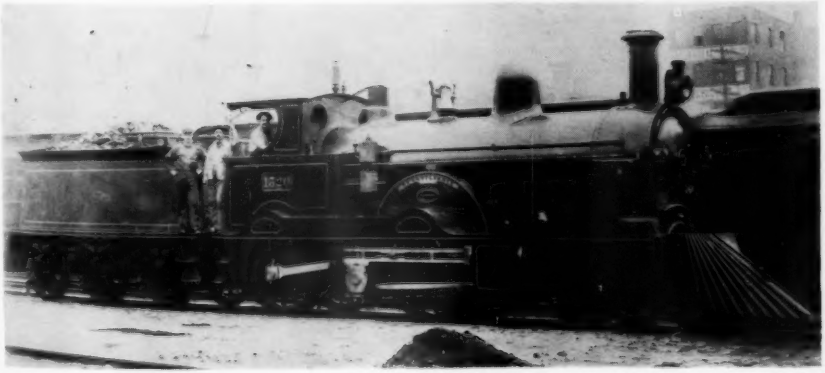
The success of the Class X(G-3) engines on the P. Ft. W. & C. Ry., led to further improvements and two new designs. Juniata No. 631, Class G-4a, P. Ft. W. & C. No. 129, 11/1899 was the first of a group of 4-6-0 type locomotives with 20x28″ cylinders, 62″ drivers, 225 lb. pressure and weight of engine 183,000 lbs. These were built for fast freight service on that road. Juniata No. 641, Class G-4, P. Ft. W. & C. No. 13, 1/1900, 20x28″ cylinders, 72″ drivers, weight of engine 184,300 lbs., was the first of a group built for passenger service. The boilers of these engines were of the radial stay type and the 225 lb. pressure was unusually high for that time. They represented an increase in tractive effort of 44% over the D-16 and D-16b classes and they were among the most powerful of their type at the time. They were used chiefly on the Lines West.

Although the Class R(H-3) consolidations were turning in a good performance on heavy trains, it was quite evident that the road must have a freight locomotive of the same hauling capacity but capable of greater speed. In 1895, three 2-6-0 (Mogul) type locomotives were built, all compounds, built on the systems of von Borries, Richmond and Pittsburgh. In 1896, one based on the Goldorf system was built. These were all classed as F-2 and their performance was compared with Juniata No. 370, P. R. R. No. 768, 12/1895, Class F-1 20x28″ cylinders, 62″ drivers and weight of locomotive 144,500 lbs. The Belpaire boiler was used carrying a steam pressure of 185 lbs. The compounds did not work out well and all were simpled and reclassified as F-1. The orginal F-1 class was modified and Juniata No. 468, P. R. R. No. 510, 2/1898 was the first F-1a delivered. These locomotives had 16% more tractive effort than the H-3b consolidations and the weight carried on three pairs of drivers was 12,000 lbs. more than the weight carried on the four pairs of the consolidations. The 62″ drivers were an advantage in moving the tonnage.

P. R. R. #1376, Class R(H-3a) Baldwin 1890, with pole car 20x24" 50" 126,500 lbs.

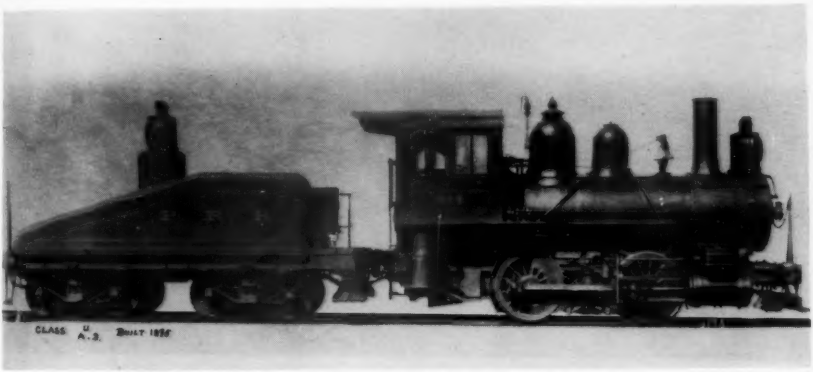


P. R. R. #1486, Class R(H-3b) Baldwin 1891. 20x24" 50" 127,000 lbs.

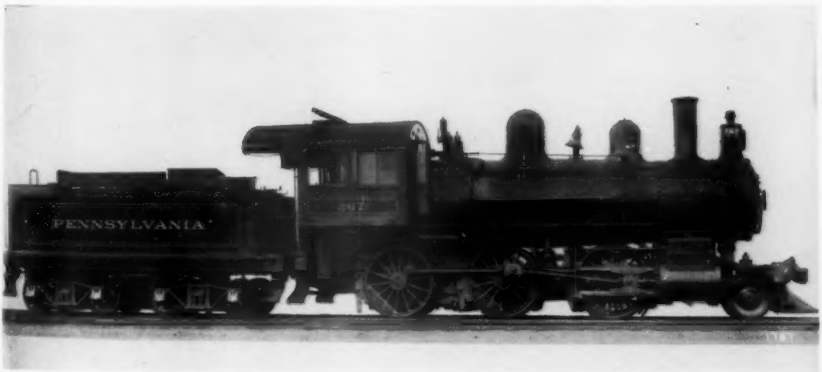


P. R. R. #1320, Beyer, Peacock & Co., 1889. 14&30x24" 75" 99,350 lbs.

P. R. R. #1515, Class T(D-15), A. M. S. 1892 on Pennsylvania Limited on New York Division. 19½&31x28" 84" 145,500 lbs.

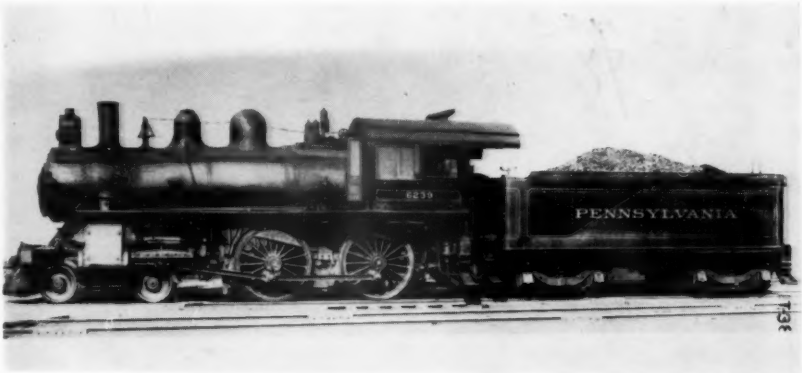


P. R. R. #914, Class U(A-3), A. M. S. 1895. 17x24" 50" 82,300 lbs.

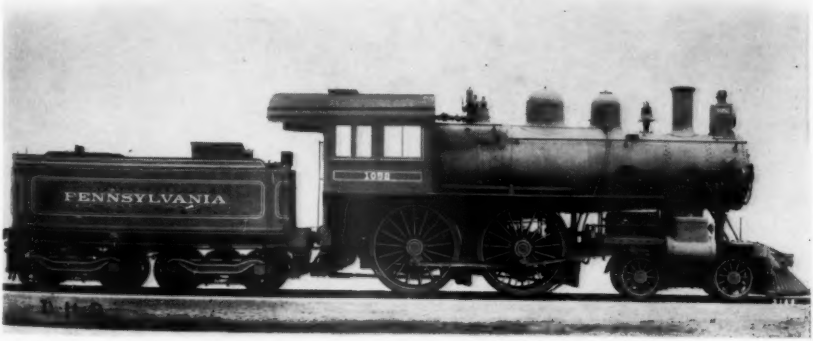


P. R. R. #267, Class F-1a, A. M. S. 1898. 20x28" 62" 145,000 lbs.

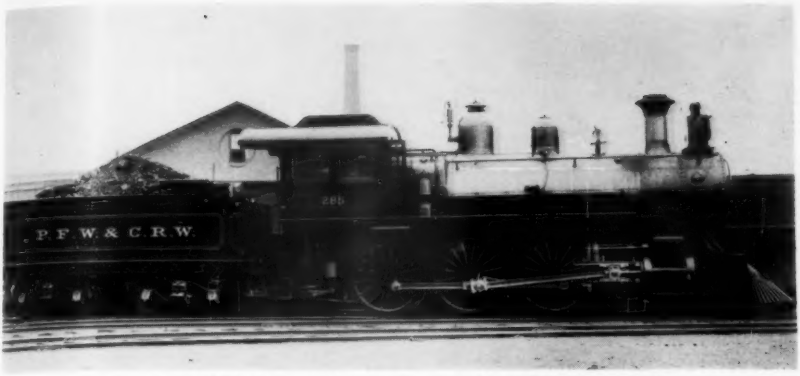
P. R. R. #296, Class L(D-16a), Juniata 1895, on Philadelphia Division. 18½x26" 80" 134,500 lbs.



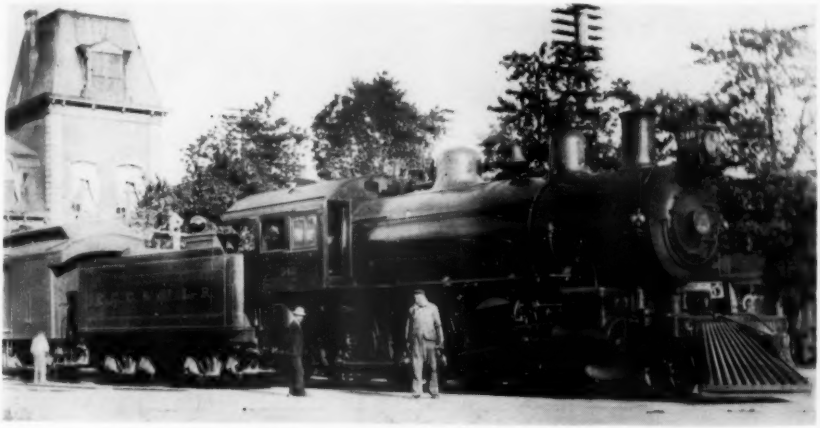
P. R. R. #6239, Class D-16b, Juniata 1903. 18½x26" 68" 138,000 lbs.



P. R. R. #1052, Class D-16d, A. M. S. 1902. 18½x26" 80" 138,000 lbs.



P. Ft. W & C. #285, Class X(G-3), Ft. Wayne 1893. 19x24" 68" 146,000 lbs.



P. C. C. & St. L. #340, Class G-4, Juniata 1900. 20x28" 72" 184,300 lbs.

Pa. Lines #7306, Class G-4b, Juniata 1889. 20x28" 62" 182,700 lbs.

At the close of the last century, three new classes of consolidations were constructed as follows:

H-4—22x28″ cylinders, 56″ drivers, wt. of locomotive 179,000 lbs. First one of this class built—Juniata No. 441, P. Ft. W. & C. No. 6, 9/1897.

H-5—23½x28″ cylinders, 56″ drivers, wt. of locomotive 196,500 lbs. First one of this class built—Juniata No. 485, P. R. R. No. 872, 4/1898.

H-6—22x28″ cylinders, 56″ drivers, wt. of locomotive 186,500 lbs. First one of this class built—Juniata No. 560, P. R. R. No. 673, 1/1899.

All classes had Belpaire boilers but the H-5 and H-6 classes had sloping tops similar to that of the F-1a. The chief difference in the H-5 and H-6 classes were that the former had 4½″ longer flues than the H-6 and carried 185 lb. pressure. The H-4 and H-6 classes carried 205 lb. pressure. The cylinders were cast separately from the saddle and the Stephenson gear used double suspension hangers for the links thus reducing the tendency for the motion work to get out of line. The H-4 was built for the Lines West, the H-5 was designed for pusher service west of Altoona and the H-6 was used both east and west of Pittsburgh. They were all neat, trim and clean cut in design.

In recounting the above, I have outlined the important and principal designs of the locomotives of this period. The reader must remember that certain sub-classes were built or created by slight minor differences. Changes in assignment of service caused others. When the Class K(D-6) locomotives, with their 78″ drivers, were found too light for service on the New York Division, drivers of 72″ and 68″ were substituted and, as such, the locomotives were used in local service but, two sub-classes were created. To record all of these sub-classes would be futile but, at the close of the next and last article will be found a table of dimensions of all of the classes designed by this road. I have taken the pains to indicate the road and shop number of the first engine built of these principal classes for the chief reason of having it on record and also because from time to time there have been illustrations published of many of these classes some of which have wrongly credited the first locomotive that was constructed.

At the close of the last century, there was a total of 3576 locomotives —2327 on the Pennsylvania and 1249 on the Pennsylvania Lines. On the lines east of Pittsburgh, the Pennsylvania was 99.5% standardized in the matter of its locomotives; the Philadelphia, Wilmington & Baltimore 89.3%; the Northern Central 100% and the West Jersey & Seashore 84.1%.

It is impossible to indicate the exact number of locomotives built for each of these classes. Locomotives of a class were built at Altoona as long as there was any need for them. As late as 1902, the Altoona Machine Shops built six locomotives of the D-13c class, a design first used in 1892, for portions of the road that needed these engines. This, plus the fact that the Baldwin Works up to this time built many of these

standard designs, makes it unwise to attempt anything in the nature of a total of each class built.

The increase in traffic, both freight and passenger, resulting from the McKinley "boom" commenced to be felt. During the closing years of the last century and the opening years of the one that followed, the road was rebuilt from stem to stern. The main line from Jersey City to Pittsburgh was practically rebuilt and made four tracks all the way. New bridges were built and others strengthened, heavier rails laid down, grades and curvature reduced and, in some instances, separate freight cut-off such as the Glen Loch and the low grade freight line were built. Improvements were made in signalling and nothing was overlooked to bring the road to top notch operating condition. The "show piece" was the new passenger terminal in New York City which was opened for the use of Long Island R. R. trains on September 8, 1910 and for those of the Pennsylvania R. R. on November 27th of that year. Alexander J. Cassatt, President of the road from 1899-1906 was the guiding hand in all of these improvements and it was he that placed the road on the solid foundation that it was to occupy in the years to come.

Errata:

In Bulletin 89, page 157, the construction number of locomotive No. 361 should read 1430, not 1440. I am also indebted to Mr. Paul T. Warner calling attention to the caption beneath P. R. R. locomotive No. 218. As shown in the bulletin, it was taken from the back of the print that originated with that road but Mr. Warner advises that the Franklin Institute of Philadelphia has a large print and the badge plate can be clearly read and that the engine was the second of that number, built in the Altoona Shops in May, 1869, shop No. 24 and became a Class G-2, not G-1 as noted in the table.

All of the illustrations used with this article were taken from the files of this Society or from the collection of the author. However, it is only fair to state that P. R. R. No. 568 with the "Pennsylvania Limited" on the bridge crossing the Susquehanna River as well as P. R. R. No. 5180 came originally from our member—H. G. Boutell; that P. R. R. No. 1515 on the "Pennsylvania Limited" was originally photographed by F. W. Blauvelt and this plate is now in the possession of Brown Bros., New York City and the Pa. Lines No. 10067 was photographed by Robert C. Schmid. The majority of the illustrations were made from the plates in the possession of the Pennsylvania R. R.

Aurora Branch Railroad Company

FIRST DEPOT AND ITS SUCCESSORS

AURORA, ILLINOIS

By A. W. Newton

In the "Birth of the Burlington Railroad," by Charles P. Burton, Aurora, Illinois (1937), appears the following:

> Old timers, who remember, say there have been four Aurora passenger depots. The first was on the east side of North La Salle Street, and later became Beiler's Livery Stable, much frequented by those who wished to hire Beiler's best, for their parties.
>
> The second was a wooden building erected on the west side of the track.
>
> A brick depot succeeded it, practically on the same site. The frame structure was sold to Brown and Meyer, and was used by them for a carriage shop.
>
> The third depot served the city many years, until track elevation required a new site.

This seems to have been the first attempt to establish the number of depots in Aurora, built by the Chicago, Burlington & Quincy Railroad and its predecessor companies, the Chicago and Aurora Railroad (1852-1855), and the Aurora Branch Railroad (1849-1852).

The statements of Mr. Burton, concerning the second and third depots are confirmed by the records of the company, and memories of "Old Timers"; their location, date of construction, and general design being well established. As to the location of the *first* depot, said to be " . . . on the east side of North La Salle Street, and later became Beiler's Livery Stable," it has been impossible to corroborate. Rumors have been traced; statements of "Old Timers" obtained; Company records searched; and editions of contemporary newspapers scanned, in an effort to collect and correlate data concerning this *first depot*.

In the Aurora City Directory (1868) appears an advertisement of John Beiler's Livery Stable stating that the business was founded in 1861, indicating that his stable was built at that time.

Mr. Len Meyer writes that he does not believe that a railroad depot was used in construction of Beiler's Livery Stable.

Mrs. James McCue, a daughter of John Beiler, now residing in Aurora, writes that she has no recollection of her father's ever having told her that the railroad depot was used in building his livery stable.

Mr. John Holden says that, "Oldest New York State Public School was moved to the south side of New York Street, between La Salle Street and Broadway, to be used as Hitchcock's Livery Stable."

Mr. Holden's sister, who was for many years a teacher and principal in Aurora's Schools, is conversant concerning this historical fact. It

seems quite probable that the rumor about Beiler's stable arose from a confusion of Beiler's and Hitchcock's stables both being operated at the same time.

It is certain, however, that with the completion of the Aurora Branch Railroad into Aurora in October, 1850, and the establishment of train service over it, and the Galena and Chicago Union Railroad, between Aurora and Chicago, depot facilities of a temporary nature, at least, were provided at some location.

The following citations and comments are predicated upon the assumption that there was a depot, or possibly two, prior to the building of the second depot, "on the west side of the track," which was built late in 1854 or early in 1855.

Rumor is that this first depot was located on the east side of the main track, on the west half of block two, original town of Aurora, and about opposite to where the third depot was erected in 1899.

Daniel Wedge, for many years an employe of the Burlington, and who will be 99 years old in October (1940), states that he believes there was a depot at the above location, as also does John Holden, a former employe of the road, and who is now nearing the age of 88. He states that: "The old depot was north of New York Street near where the second depot was built."

The location of this reputed station with reference to location of the two succeeding stations, is quite in keeping with common practice of railroads to retain locations of stations when rebuilding or replacing same, largely because of desirability of location, and because of railroad facilities that have grown up about it. This, together with long persisting rumor, seems to warrant the conclusion, that for a time prior to 1855, a depot was maintained here, although it may not have been the first one.

Whatever station facilities were provided must have been of a more or less temporary nature, as well as of limited capacity, for immediate needs were not great nor were plans for expansion of the property at that time (late in 1850 or early in 1851) in any state of development. Such facilities only functioned during the years 1851 to 1854, inclusive.

The type of structure has not been determined from search of records, nor from statements of early inhabitants. At the time of building the *second depot*, and for some ten or twelve years after, there stood a frame warehouse or freighthouse on the east side of the tracks in about the location of the reputed first depot.

On Rufus E. Moore's "Map of City of Aurora," printed in the early '60s, this building is shown, but it must have been dismantled shortly afterward, to make way for a large coal chute built in 1868. A "Map of Aurora," dated 1868, does not show this warehouse, but does show the "coal chute."

The rumor that this building was first used as a depot, is without foundation.

On July 16, 1867, there appeared in the "Weekly Aurora," edited by Mr. Dudley Randall, an item concerning the Aurora Branch Railroad, in which, speaking of the interest of the citizens of Aurora in

this, its first railroad, it was stated: "They would walk up to Indian Creek then to see the cars come in, just as readily as they would now walk to the new passenger depot."

The new passenger depot above referred to, was the brick station, completed a few months before the appearance of Mr. Randall's editorial. He was writing from personal knowledge and experience, for in August, 1850, he walked up to Batavia to attend the celebration marking the completion of the Aurora Branch Railroad into that city. This statement of Mr. Randall's would seem to indicate that when the road first reached Aurora, October, 1850, its terminus was near Indian Creek; possibly in the vicinity of Pearce (Pierce) Street, and that for a time a passenger station was maintained there, and here equipment was turned on a wye located north of Indian Creek. Mr. Alex Forsythe, long superintendent of Aurora Shops prior to his death, stated that the location of the wye was north of Indian Creek.

The location of station facilities at this point must have been temporary and of short duration, but there are other matters of record that lend color to the possibility that here is where the *first depot* in Aurora was located. Such records as are in existence covering the promotion and building of the Aurora Branch Railroad disclose conditions that seem to confirm the possibility that here was established the first depot of that road in Aurora.

In a report of the Chief Engineer, Mr. J. L. Hanchette, dated February 25, 1850, submitted to the Board of Directors, he said: "In the letting in December last, there was 11½ miles of grading awarded." This mileage would only include that territory between Turner Junction (West Chicago) and a point just north of Indian Creek, and not to Main and La Salle Streets in Aurora, the final terminus of the road.

The records of meetings of the Board of Directors indicate financial difficulties at that time, due to the failure to sell sufficient stock to provide construction funds, and default of many stock subscribers. April 25, 1850 with construction just underway, the Board authorized the issuance and sale of $45,000—5 year—bonds, in order to provide funds for the completion of the road.

Combining the adverse financial condition, the statement of the Chief Engineer as to letting of contracts for only 11½ miles of grading, and the statement of Mr. Randall, made in 1867, it is not unreasonable to assume that on reaching the outskirts of Aurora, near Indian Creek, there occurred a temporary cessation, through the winter at least, of line construction. At the same time, with train service inaugurated October 21st, 1850, between Aurora and Chicago, it would certainly be necessary to provide some sort of depot facilities, even though temporary.

Another rumor, that the first depot was located in the warehouse of E. R. Allen, on Lot 9, Block 7, original town of Aurora is not confirmed in any respect. In a letter from Mr. Frank Gates Allen, son of E. R. Allen, received shortly before his death this year, he said: "I, of course, remember my father's warehouse very well, and was in and

about it, working and loafing for a great many years, and the warehouse did not show any signs of its being used or having been used as a railroad station."

One of the first sidetracks built by the Aurora Branch Railroad, to serve an industry, left the main line north of New York Street, extended across that street, and across Lots 10, 11, and 12 in block 7, entering the Allen Warehouse about the middle of the building. An old map of Aurora, dated 1882, shows this building and track as still in existence at that time.

Mr. Daniel Wedge, Mr. John Holden, and Mr. Len Meyer, have all stated that they do not recall ever having heard of this warehouse being used as a depot. Nothing of record has been found to confirm this rumor, and it may be dismissed as being without foundation.

In a search of Company records of real estate purchases by the Aurora Branch Railroad, it is shown that the first three parcels of land acquired within the city limits were parts of Lots 10 and 12, and all of Lot 11, of Block 7, just north of lot occupied by Allen's warehouse. These lots were acquired by deed dated July 15 and August 23, 1850—some six or seven months prior to the acquisition of property on Block 2. The shape of these lots, as well as the fact that they were acquired prior to any other property within the city proper, prompts the thought that they were originally purchased with a view to use for depot purposes. This may have been the original plan, as it would have placed a depot within two hundred feet of the end of the line as finally built, and near the center of commercial development at that time. There has been no evidence found to confirm this, and if, originally, these lots were acquired for depot purposes, the plan was abandoned, for immediately after the building of the Allen Warehouse in 1851, at least one industrial track was built across them.

Of the four possible sites for the *first depot*: (1) near Pierce (Pearce) Street, and Indian Creek, near north city limits; (2) on Block 2, adjacent to where the two succeeding depots were built; (3) in Allen's Warehouse on Block 7; (4) and on lots in Block 7, just north of Allen's Warehouse; the two latter may be disregarded because no evidence was found to support these rumors.

For the first two locations, there seems to be sufficient evidence to warrant the conclusion that instead of a *first depot*, as stated by Mr. Burton, at least two depots were built prior to the construction of the *second depot* "on the west side of the tracks"; first a temporary one north of Indian Creek, and near Pearce (Pierce) Street, and later another on east side of main track, on west half of Block 2, original town of Aurora, "just north of New York Street," as stated by John Holden.

From 1854 to the present time there are rather complete records of the three depots that have served the railroad and the people of Aurora. The frame depot, "on the west side of the track," served from 1855 to 1866, inclusive; its successor, a two story brick depot, in practically the same location, served from 1866 until 1922, at which time the

present depot, located south of Washington Street on west side of Broadway, was built in connection with realignment and track elevation through Aurora.

While there are no plans in existence of the "frame depot on west side of track," its location is well established, and its general design has been developed from statements of those now living, who have distinct memories of how it looked to them and who for a number of years had occasion to use same.

April 28, 1854, a lease from the Town of Aurora was made to the Chicago and Aurora Railroad, successor to the Aurora Branch Railroad, for a portion of La Salle Street, between Spring and New York Streets, "for use for depot purposes." Late in 1854, or early in 1855, the depot was built in connection with realignment of original Aurora Branch Railroad, between Pearce (Pierce) and New York Streets.

This realignment was made in connection with plans for improved yard facilities and construction of extensive car shops, begun in 1855, and made necessary because of the rapidly increasing mileage of the road, and the consequent increase in power and rolling stock. It had recently (February 14, 1855) acquired the name of Chicago Burlington and Quincy Railroad Company.

This frame structure served as a depot from 1855 until 1865, when because of need for a more capacious building, it was sold to the firm of Brown and Meyer, carriage builders, and moved across La Salle Street to their property, Lots 5 and 6, Block 3, in order to permit of construction of a brick depot on practically the same site.

From Mr. Lon Meyer, son of Joseph Meyer, of the firm of Brown and Meyer, who is now living on a ranch near Vim, N. Dakota, much helpful information as to design and size of this depot has been obtained. With this information, coupled with statements of Mr. Daniel Wedge and Mr. John Holden, both of Aurora, who have distinct recollections of appearance of this building; a sketch has been prepared embodying the features recalled by these men. The building, according to the memory of these men, included certain architectural features, strikingly like those in various original depots still in existence on the line from Turner Junction to Galesburg, all of which were built in 1853 and 1854 and 1855. Doubtless one person designed all these structures, varying each one to suit local requirements, yet retaining the same general style of architecture.

Who this person was, is a natural question in the study of these structures. The name of J. M. Berrien at once becomes outstanding. During the years 1852 to 1854 he was the Chief Engineer in charge of construction of the Central Military Tract Railroad, extending from Mendota to Galesburg. During that period the Chicago and Aurora Railroad was building from Aurora to Mendota, and for a part of its period of construction, was without a Chief Engineer, and because of Mr. Berrien's intimate connection with John W. Brooks, President of the Central Military Tract Railroad, and James F. Joy, President of the Chicago and Aurora Railroad, it is reasonable to assume that he

exercised more or less control over the engineering problems of both roads.

It is also a matter of record that soon after coming west from Detroit to become active in construction work, he designed and built a fireproof vault, in the building on South Water Street, Chicago, then the general offices of the road, indicating that he was active in more than just construction of the road from Mendota to Galesburg. Furthermore, he was an architect of more than ordinary ability, designing and building many edifices; such as churches and commercial buildings in Detroit and other Michigan cities, during his long engineering career.

Recently, a copy of a picture of the first depot built at Galesburg was procured. It was undoubtedly built under his direction, and included many of the architectural features embodied in the depots along the line from Turner Junction (West Chicago) through Aurora and Mendota to Galesburg. Furthermore, records indicate that a portion of the time (1852 to 1855) that he spent on these lines, his headquarters were in the General Offices of the Company in Chicago; then located in a stone building of the Michigan Central Railroad at corner of East South Water Street and Beaubein Court.

Taken all in all, it seems reasonable to assume that John M. Berrien designed and directed the building of all the depots between Aurora and Galesburg; as well as the depot at Batavia, built in 1855 to succeed the original structure built there in 1850.

Following this digression from the real subject under consideration, the history of the last two depots, which is largely a matter of quoting existing records, is briefly stated. Succeeding the frame depot, built in 1855, and sold in 1865, the brick depot, completed in 1866, replaced it in practically the same location and served the community and company until 1922, when it was torn down to make way for track elevation through Aurora, then nearing completion.

The Annual Report to Stockholders for the year ending April 30, 1867, states:

> "There has been constructed during the year a large brick passenger house" (President's Report) and in the Chief Engineer's Report: "A new passenger house was built at Aurora of brick on stone foundation, two stories high, containing, besides waiting room for passengers, and ticket office, good and convenient offices for telegraph, and the different officers of the road stationed at that place."

The Chief Engineer was Max Hjortsberg, who in later years was prominent in civic matters in Chicago. This depot, after a life of 56 years, was in excellent physical condition when torn down. The present depot, a brick and concrete structure, was completed and placed in service in 1922, and provides space for passengers, baggage and express on first floor, with offices on second floor for complete staff of Divisional Officers.

The succession of depots in Aurora, as indicated by this study may be briefly summed, as follows: Instead of four depots as stated by Mr. Chas. P. Burton, in his "Birth of the Burlington Railroad" (1937), the evidence tends to the conclusion that five different depots cover the period from 1850 to 1940—or 90 years.

The *first* was a temporary structure at or near Pearce Street, north of Indian Creek, in the then northern limits of Aurora, and probably only used during the winter of 1850-51. The *second*, a frame building located on the east side of the main line of the Aurora Branch Railroad, and on the west half of Block 2, original Town of Aurora. Its exact location is not determined, but it must have been about at the toe of slope of present fill just north of New York Street.

The *third*, likewise a frame structure, situated on the west side of main track, which had been changed as to location, because of realignment occasioned by development of terminal facilities, including extensive shops. This building, according to information obtained, was of the type of architecture adopted for the entire line, Turner Junction to Galesburg, of which there are examples still in existence after 85 years of service.

The *fourth*, a two story brick building, erected in 1866 and remained in service until 1922, when torn down to make way for Aurora track elevation, then being completed.

The *fifth*, the present commodious two story brick and concrete structure of modern architectural type, is located on west side of Broadway just south of Washington Street.

This study, begun several months ago, was made in an effort to establish the location of the *first depot* built in Aurora by the Aurora Branch Railroad. The results cannot be said to have been wholly conclusive, but from information so far available, seem to warrant the above conclusions.

Information obtained from the Aurora Public Library, the Aurora Historical Society, Mr. Charles P. Burton, Mr. Daniel Wedge, and Mr. John Holden, all of Aurora, and Mr. Len F. Meyer formerly of Aurora, now living near Vim, North Dakota, was especially helpful in this study.

Aurora Branch Railroad Depot, Aurora
- Opposite Chicago Lumber Yard: Beacon, 4/17/51 p. 11
- Opposite Empire Hotel: Guardian 11/10/52 p. 3
- Adjacent to Allen's Warehouse: Guardian 11/3/52 pp. 3-4

Chicago and Aurora Railroad Depot, Aurora
- In 1856, opposite city jail (10 feet distant): pamphlet, "Reminiscences" (Aurora, 3/3/92), p. 6. Copies in Aurora Museum; another possibly in Aurora Public Library.

The Marl Trains of the Camden & Amboy R. R.

By N. R. Ewan

The unusually well-preserved photograph reproduced herewith, brings reminiscences of one of the unique branch lines of the famous Camden & Amboy Railroad, which inaugurated steam transportation in New Jersey, in 1834. The pioneer locomotive was, of course, the nationally known "John Bull," whose knocked-down parts were assembled without benefit of instructions from its English makers, in the Bordentown shops. Its first run over an experimental section of track, in 1831, is memorialized by an imposing monument near Bordentown, built from the stone block of the rail supports and sections of the well-worn, English-made rails, themselves.

This photograph of an early locomotive and open marl cars was depicted a few years ago, in a well publicized advertisement in nationally circulated magazines, and was captioned as typifying the "pick and shovel" days of the Pennsylvania Railroad. Actually the pick and shovel activities were being directed to the less glamorous task of loading a Vincentown Branch train with marl, and the picture was taken about 1866 or 1867, long before the Pennsylvania was in any way connected with the New Jersey railroad operations.

The President of the Vincentown Branch is recognized at the extreme left of the picture. The Vincentown Marl Company pits were the terminal for an extension of the branch line over which more than a hundred thousand tons of marl were transported, destined to distant points, by this old time equipment. The "gig top brakesman" is shown beside the buggy-like shelter on the rear of the enclosed tender. This really important official of early trains enjoyed at least partial protection in his lofty perch in the curtained enclosure, and watched the long string of following cars for that buga-boo of early railroading, disconnection of the coupling links between cars. A rope signal cord to the engineer below would indicate these too-frequent breaks, and "back ups" for the lost sections were almost routine.

This was, of course, in the era of wood fuel, and huge piles of oak and pine, cut in regulation four-foot lengths, were stored at terminal points or at important in-between stations. Before the convenience and time saving virtues of overhead tanks were recognized, water supplies for the early engines were pumped into the old saddle reservoirs by hand.

Many of the Camden & Amboy branch lines depended upon the marl freights for much of their revenue and, for some decades, this over-rated fertilizer demanded great numbers of special "marl cars," with low sides for easy loading. In later years, commercial fertilizer proved more efficient and farmers gradually lost faith in the old-time, bulky marl deposits. The Vincentown Branch tapped the main line at Ewansville and, on its two and a half miles between terminals, no less than five station stops were regularly scheduled. It is an actual fact that every farm along the right-of-way boasted a platform station,

and they ranged from the Vincentown end thus; Butterworth's Corner, Montgomery's Old Maids Lane, Burnt House, Smalley's, and Ewansville terminal, a fare differential to each station made a conductor's life one of mathematical calculations. In the 1890 period, special full carloads of milk were sent from this branch to metropolitan centers.

In its early days, a one-car train was operated by a diminutive "dummy" engine, and some six round trips daily brought passengers to connecting trains for Philadelphia and New York. This small road, by reason of its free and easy train crews, who welcomed help from ambitious boys, was a training school for numerous youth who passed from their informal apprenticeship as handy men to regulation railroad workers, and some of them graduated to high places in the big transportation system.

A story is told of a well-liked conductor, who won the friendship of the famous Pierre Lorillard by his genial attention to the financier's comfort, on the train which brought him to his well known racing establishment at Jobstown. In appreciation, the great turfman presented the trainman with a Tiffany-wrought, filagreed, solid gold conductor's insignia for his uniform cap. Unfortunately, the rules of the Pennsylvania System, into which the branch had been passed, tabooed this ornamental insignia as irregular, and the embarrassed Mr. Lorillard, in spite of all his influence in high places, failed to win for his favorite conductor the privilege to wear the elaborate badge.

This rural branch, which began operation in 1864, was one of the first to feel competition of auto trucking and, after a number of years of financial difficulties, succumbed to the fate of so many other small lines. Its total abandonment came in 1927, and today few traces of this once prosperous branch road can be found. Seventeen shares of the original stock are still outstanding, on which the Pennsylvania Railroad Company continues to pay a 7% dividend, which obligation is required under the terms of the 999-year lease of the United Railroads of New Jersey, executed in the early 1870's.

Train Rules Issued to Andrew Quinton, a Camden & Amboy conductor in 1845. Copied from the original by N. R. Ewan. Mr. Quinton was conductor on the John Bull locomotive trains.

"Instructions—Philadelphia & Trenton Railroad Line 3. To Andrew Quinton. Sir: You will leave Trenton at 7:30 and Burlington 8 o'clock. If you find no flag up, remain on turnout till Camden & Amboy line passes, and if no Line is in sight, when you get to Dank's (Dank's Ferry, now Beverly) proceed on carefully with a man ahead (at curves) and give New York Line the preference and thus continue on to Camden at regular speed, if you can arrive by 9:28 (regular time to be in Camden is 9:20). If you cannot arrive by 9:28, stop at deep cut, if you can arrive there by 9:35, and remain until 9:50. . . . .

if Mail Pilot Line does not arrive. If you cannot reach deep cut by 9:50, stop at Fish House turnout till 9:55 if the Line is not in sight, then proceed on to Camden with a man ahead.

Returning you will leave Philadelphia punctually at 2 o'clock P. M. and proceed from Camden on arrival of Mail Post Line, provided it arrives by 2:30. If not in at that time proceed on. The general Instructions on the Railroad have been altered so that the train first arriving at the turnout must go on it. You will regulate your watch daily by the office time in Philadelphia. The New York 7 o'clock Line will leave Burlington at 8:30.

WM. H. GRATZ, (Supt.)

P.S.—You will take water at Rancocas, (now Belanco) when there is water there."

One of the Marl Trains on the Camden & Amboy R. R. The locomotive cannot be identified.

Some Comments on a Letter of 1833 from the Baltimore & Ohio R. R. to the Stockton & Darlington Ry. in England

By G. A. Petch

The cause of these few notes is a letter of 1833 recently unearthed in the book used by an ironmaster of Darlington, England, to record copies of his outgoing mail. The letter was written by Evan Thomas in Baltimore to Edward Pease, the founder of the first English public railway, the Stockton and Darlington. Edward Pease lent the letter to a young acquaintance of his, Alfred Kitching, who had just extended the family iron business to supply the railway. The letter reveals what was considered of sufficient news value in 1833 on the Baltimore and Ohio Railway to write a letter about it to send across the Atlantic. Similarly the fact that Kitching made a copy of it shows it was of outstanding interest to him, an English railway engineer, for this was a practice which he followed on no other occasion in his letter books.

Baltimore
11 Mo. 26, 1833

Respected Friend,
Edward Pease.

The bearer of this letter is my nephew John Ellicot who will I expect visit your very interesting Rail road Establishment, in the course of his Tour in England.

As he is well informed relative to the present state of the acts in this country he may perhaps be able to impart some useful hints in matters of that nature.

We have been steadily progressing in improving our railroad system especially the machinery connected with—as it regards Steam Power our advance has been very great. Our engines now building are to convey 120 tons 15 miles the hour on a level road. The boilers are vertical, 4 feet diameter with 400 tubes or pipes 15 inches in length. The fuel is anthracite coal which neither gives out smoke nor particles of inflammable matter, when properly ignited it imparts an intense heat. This is effected by applying the waste steam to a fan which throws a powerful current of air into the furnace. The Engines now in operation generate steam so rapidly that at least 1/3 is thrown off. The tubes or pipes last 3 times as long as those in Stephensons Engines. We have also made great improvements in those parts of waggons and carriages subject to friction by which they not only last much longer, but a prodigious saving of oil is effected as well as much time in oiling.

We have likewise improved the form of our wheel and have recently rendered it much stronger by introducing a wrought iron ring in it, so that even should a wheel become fractured by a severe concussion it still continues serviceable being held together by the iron ring. I am informed by the superintendent of Machinery on the Baltimore

and Ohio Rail road that not one wheel has yet given way in which the wrought iron ring has been inserted. In the Locomotive Engine wheels two wrought iron rings are inserted and such is the firmness with which they are held together that it has been found impossible to break them asunder with sledge hammers until a sufficient portion of the cast metal is detached to permit the ring being cut by an instrument. John Ellicot will take with him a segment of one of the waggon wheels, showing the wrought iron ring, the ring should be warmed a little before it is put into the mould. All our wheels are chilled on the outer periphery, the insertion of the iron rod in the thickest part of the wheel makes the case hardening more perfect at that point. (?)

From thy affect. friend

EVAN THOMAS

Both the Darlington men concerned were Quakers, whilst the use of the phrase "Respected Friend" as a mode of address and the scrupulous use of the merely mathematical "11th month" instead of the heathen word "November" show that the American writer belonged to the same religious group. The Quakers have been most commonly known for their "Meetings" in which all sat in silence until divinely inspired to speak. Another less known but important aspect of their Society was the thoroughness of its organization on an ascending scale of Meetings from local to national, the whole structure bound together by ministers who travelled from Meeting to Meeting inside the country and also abroad as "the spirit moved them" and "way was opened." Edward Pease's published diaries show that, despite the difficulties and distance of connections with America, he was very well acquainted with the interests and problems of American Quakers. Hence this familiar association, religious in its foundation even though commercial in its present uses. There were, of course, other and purely commercial relationships between the railwaymen of the two countries. Stephenson's firm and others were exporting some locomotives to America and John Ellicot was not the only American of the time to make a tour of inspection of the English railways. We are apt to think of Anglo-American economic co-operation as a post-1939 novelty. Here that idea is proved wrong by over 100 years.

The various technical points in the letter would be of interest to the Darlington men, partly because they were tackling the same problems themselves, partly because of their peculiar position in English railway engineering. The Darlington railway, which was then eight years old, owed a great deal to George Stephenson whose son's multitubular boilers are referred to in the letter. But, in addition, its locomotive superintendent was Timothy Hackworth, Stephenson's great rival in engineering, a man who developed his engines on somewhat different lines from Stephenson and who, perhaps unjustly, did not achieve the same position as Stephenson either in his own day or in history. Examples of both the Stephenson and Hackworth engines were on the

Darlington line. Their respective merits are still debated in England and if John Ellicot saw them and commented on them it would be instructive to hear the skilled opinion of a neutral observer.

The stated performance of the Baltimore engine is certainly impressive as compared with accounts of the Darlington engines of the period. Some few facts may point the comparison. In 1829 Hackworth's engine the Royal George (built 1827) "took 48¼ tons of goods up and down a portion of the line having a gradient of 1 in 528, a total distance of 5,000 yards, at the rate of 11.2/10 miles per hour, steam was blowing off when the experiment was concluded." In 1833 mixed goods and passenger trains of unspecified weights were traveling at 12 to 14 miles per hour, whilst the railway's "mineral" engines of this period (i.e. engines hauling coal) have been credited with the following performance over gently rolling country.

	Nos. of wagons	Gross Load Down tons	Load (Empty Wagons) up tons	Average Speed miles
"Majestic" class	26	104	35	6 to 8
"Wilberforce" class	32	128	44	6 to 8

All these figures come from Tomlinson's "The North Eastern Railway."

Stephenson's multitubular boiler was represented on the Darlington railway by examples of his "Planet" class with boiler dimensions 6 feet 5 inches in length, 2 feet 9 inches diameter and 129 tubes of 1⅝ inches. Hackworth, by contrast, had been content to make further developments of the single flue design. His "Royal George" had a return flue and engines of the "Majestic" and "Wilberforce" classes had straight flues combined with copper fire tubes.

Hackworth would no doubt be interested in the method of stimulating the fire. The system of increasing the draught by leading exhaust steam into the chimney goes back to Trevithick, but Hackworth has been credited with increasing the efficiency of the device by tapering the orifice of the exhaust pipe. This was another feature of his "Royal George."

In connection with the reference to oil, a glimpse of the Darlington lubrication problem is seen in one of the other letters in Kitching's letterbook in which he refers to repairing a wagon broken "in consequence of the negligence of the Enginemen omitting to oil the axle from which neglect the axle was nearly through so that it was unable to sustain the weight of the coal any longer and broke."

The question of "smoke and particles of inflammable matter" was perhaps too topical. From the beginning the Darlington railway had encountered strong opposition from the local aristocracy and the company had only just successfully emerged from an indictment on the grounds of the nuisance caused by the use of locomotive engines "which exhibited terrific and alarming appearances" when travelling at night, emitted "unwholesome and offensive smells, smokes and vapours," and

made "divers loud explosions, shocks and noises." There was also the question of the damage done to wooded plantations by sparks from the engine. The Darlington solution was to reduce speed through the plantations to 5 m.p.h. and have a watchman stationed there to report offending engines which could be identified by a large numbered board projecting from the funnel.

Finally on the question of wrought iron wheels: in England the credit for first putting wrought iron tyres onto cast iron wheels has been claimed for both Hackworth and for Nicholas Wood of Newcastle upon Tyne, both in 1827. William Losh of Newcastle took out a patent for malleable iron wheels for railway carriages on August 31st, 1830. In his "The British Steam Locomotive" Ahrons describes Stephenson's wheels of the period 1830-37 in this way: "In the engines . . . the hollow boss and rim were of cast iron. The rim was also with a hollow groove round it to lessen the weight. The spokes were wrought iron tubes tapering from 2¼ to 2 in. diameter cast into the boss and rim, and arranged so that alternate spokes slanted in opposite directions. The tires of the driving wheels, 5 feet diameter, had a mean thickness of only about 1.7/16 in., all tires were of wrought iron, welded. The driving tires of Stephenson's engines had no flanges." Hackworth's engine wheel was designed for the "Royal George" and it was used on nearly every engine on the Stockton and Darlington railway for many years. It was cast iron with either a chilled face or with wrought iron tyres shrunk on. As regards wagons, however, according to R. Young in "Timothy Hackworth and the Locomotive," the chaldron wagon wheels remained little changed in design between 1825 and 1856 although the company came to have between 1,500 and 1,600 in use. They all had cast iron wheels and in severe frost would break 1,200 to 1,500 of these in a month.

Presumably it was the relative cost which kept the cast iron wheels in use. It certainly could not have been the fossilising effects of tradition for there was no tradition to fossilise. That is another aspect of comparative Anglo-American history which has often been overlooked, namely that the history of the Eastern United States in many economic respects is not the history of an organisation younger than the British but contemporary with it. Whatever there was on the Baltimore and Ohio, there certainly was pioneer improvisation on the Stockton and Darlington. The young Quaker who copied this letter had learned about engines by working among them. In 1833 he was repairing them. Soon he was to repair one so extensively that he really rebuilt it. After that he began building in his own right. In this work he was helped by his brother and some survivals give an inkling of the spirit in which they worked. There is still in existence a little book called "Roberts's Mechanics' Assistant, or, Universal Measurer." It is dated 1833 and signed on the flyleaf by one of the Kitchings. This assistant to locomotive engineers announced itself as being "Adapted to the Use of Engineers, Mill-Wrights, Iron Founders, Smiths, Forge-Men, Rollers and Slitters of Iron, Timber Merchants, Architects, Sur-

veyors, Joiners, Carpenters, Masons." Its contents included the "Use of the common slide rule, with examples" and it had an appendix "exhibiting the strength of materials, and a correct Method of calculating the Horse Powers of a Steam Engine." Similarly their letters of the time contain such requests as one to forge the iron shafts "to the specified diameter as near as you can." Or again there was this instruction: "be particularly careful in placing the columns on which the boiler rests very trim and square otherwise it will cause us a great deal of unnecessary trouble and expense. . . . N. B. Get as large a plate on the top of the main tube as you can. Only just leave sufficient room to rivet and no more and also keep the main tube the full size inside according to the plan."

Furthermore, if the young American who came to Darlington armed with the Baltimore letter took a trip down the Stockton and Darlington railroad he would have found the passenger traffic only just taken over by the company from private contractors and the goods traffic let out on contract. If he had continued further down the river Tees than Stockton he would have entered that most American phenomenon—a railhead town, this one named Middlesborough and growing apace on what had been, a few years before, the land of a solitary farm.

G. A. Petch.
King's College in the University
of Durham, England.

The letters quoted in this article are reproduced by courtesy of Whessoe Limited, Darlington, successors to the original Kitching firm.

The McConnell Locomotives

CHARLES E. FISHER

As the majority of our members know, the Union Pacific was one of the first railroads that spanned this continent bringing the east coast in direct touch with the west coast. Since its completion, May 10th, 1869, the road has had its trials and tribulations, in common with many of the western carriers, but it has emerged today as one of our outstanding western railroads. During these years it has purchased locomotives from nearly every builder in this country and some of its recent locomotives have been outstanding in design and in performance. It is of interest that during the Harriman regime, when both the Union Pacific and Southern Pacific were under the same management, plans were drawn up for groups of locomotives standard to both roads and de-deliveries were made of some of these types.

For a number of years, one J. H. McConnell was Superintendent of Motive Power at Omaha, Nebraska. His locomotives were fully as distinctive as those of the Pennsylvania, Canadian Pacific or any other railroad. The type of coal used by the road required a short front end and a diamond stack and altho' both were a success so far as the steaming capacity of the locomotive was concerned, the cinders were not thrown high enough to keep them away from the passengers. These, together with the long sloping pilot, the headlight, flat topped steam and sand domes, outside injectors despite the cold weather, large capacity tender with the ladder up the back and the main air reservoir on the tender, were all distinctive features of the McConnell regime. A traveller using that road in the last decade of the past century would have seen but little else in service on the road.

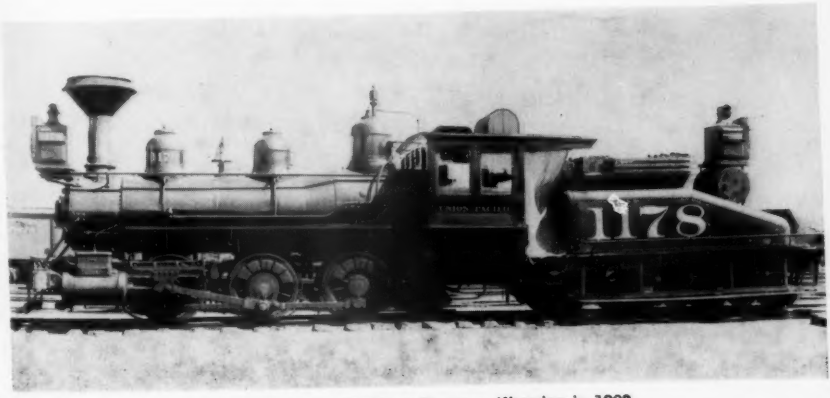
Through the kindness of our member, Mr. Fred Jukes, we are privileged to illustrate his beautiful detailed drawing and four photographs of these engines. I am also indebted to "Jerry" Best for checking the mechanical data from his records.

Union Pacific No. 847 was photographed at Rawlins, Wyoming, about 1895. The engine was built in the Omaha Shops of the Union Pacific in 1893 with 18x26″ cylinders and 63″ drivers. The engine is on the eastbound "Fast Mail" and the train recalls the famous story by Frank H. Spearman—"The Yellow Mail." In May of 1909, the locomotive was sold to the F. C. Sonora where it was assigned No. 158 and that was where she was retired in 1931.

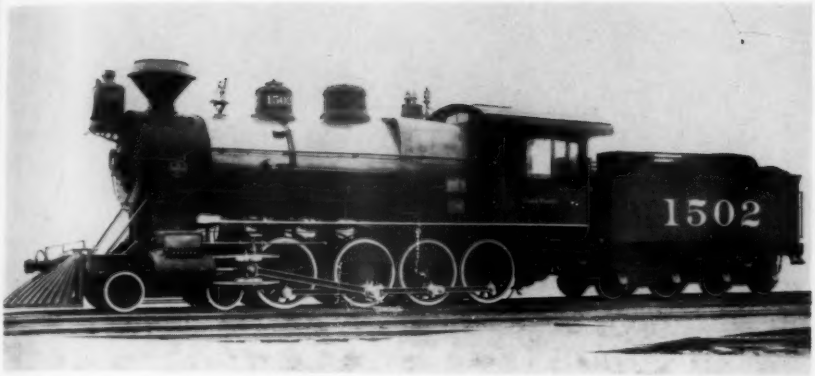
Union Pacific No. 1178 was photographed at Cheyenne in 1902. It was one of ten switching engines delivered in March, 1890 from the New York Locomotive Works, Rome, N. Y., under construction No. 581. As built, the locomotive had 18x26″ cylinders, 50″ drivers and, in 1917 was rebuilt to a 2-6-0 type and assigned No. 4000.

Union Pacific No. 1316 was one of eight locomotives built by Brooks in 10/1895, construction No. 3066, with 20x24″ cylinders and 51″ drivers. She was subsequently renumbered 115.

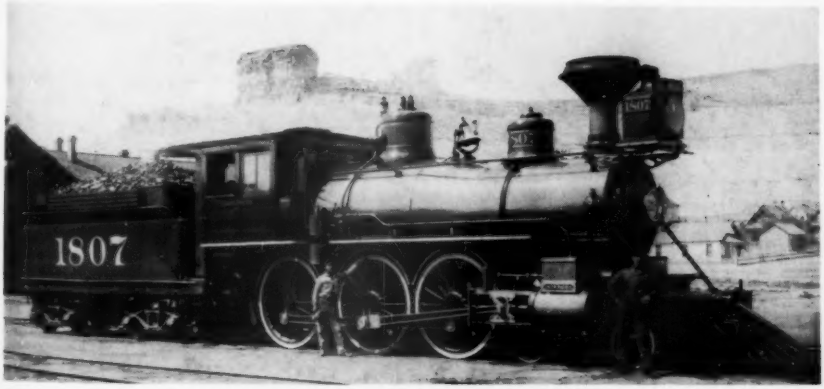
Union Pacific R. R. #847 at Rawlins, Wyoming, about 1895.



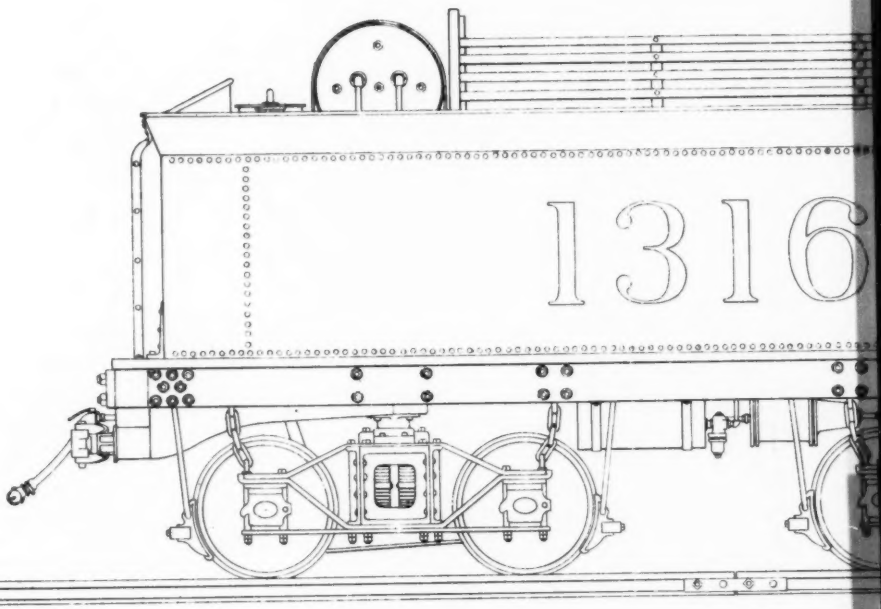
Union Pacific R. R. #1178 at Cheyenne, Wyoming in 1902.

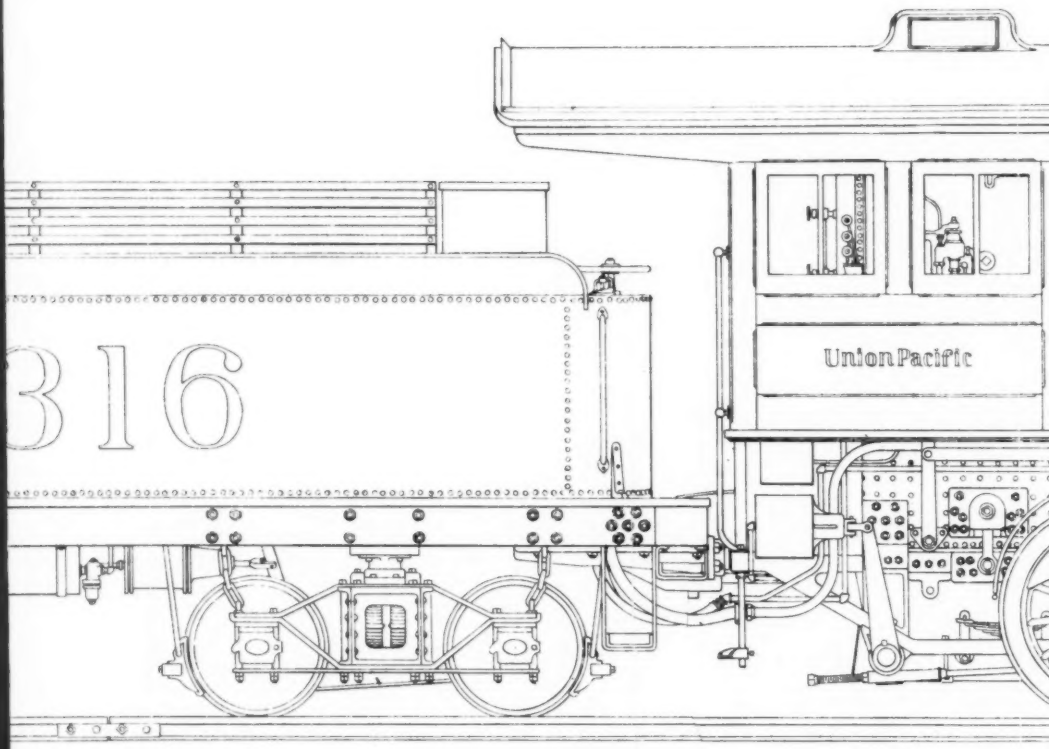


Union Pacific R. R. #1502, Brooks, 1899.



Union Pacific R. R. #1807, at Green River, Wyoming.


1316



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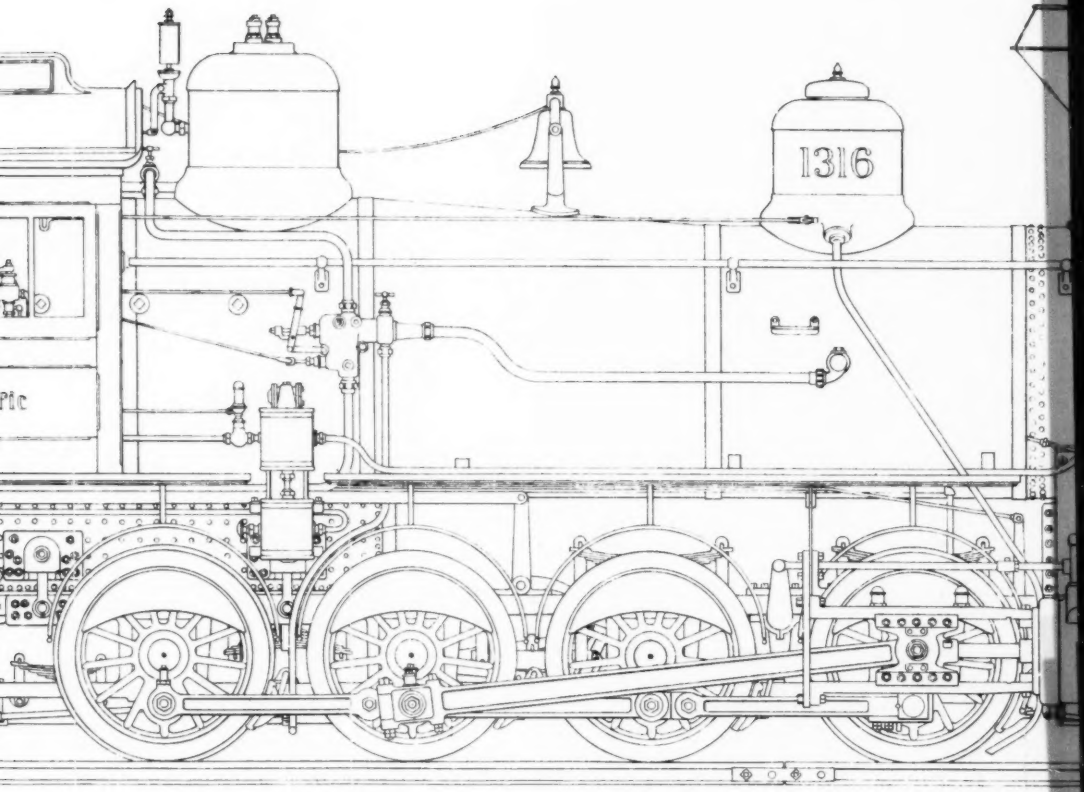
1893

J. H. McConnell, Supt of



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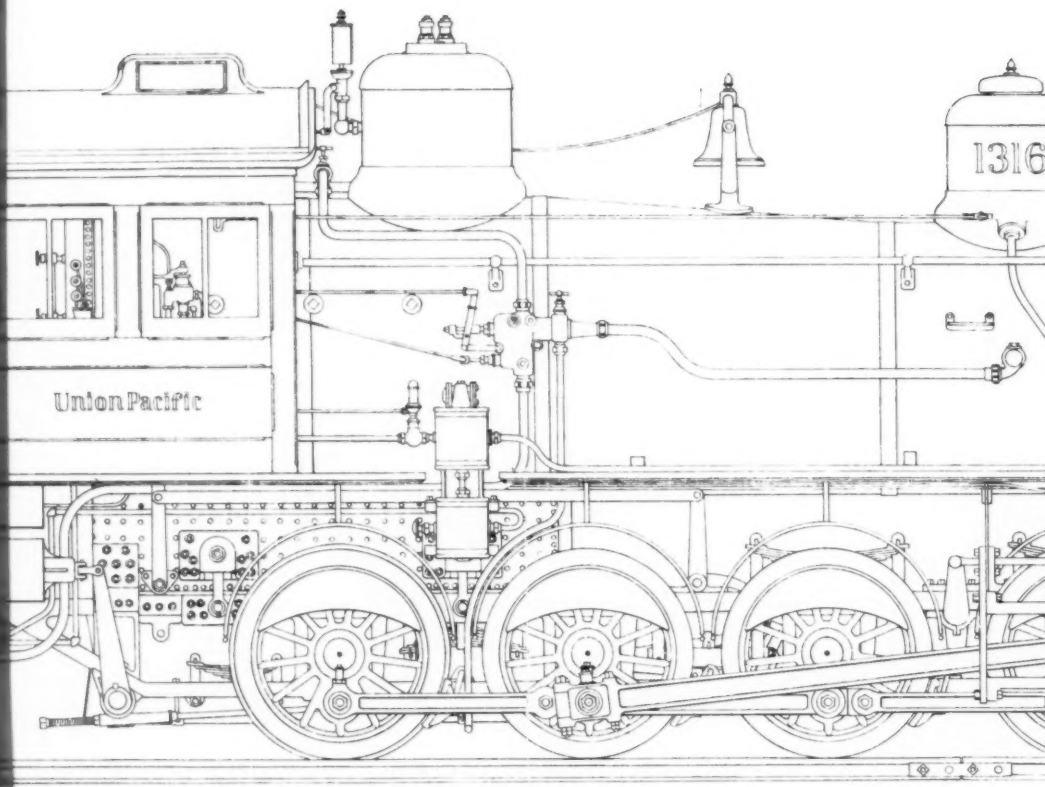
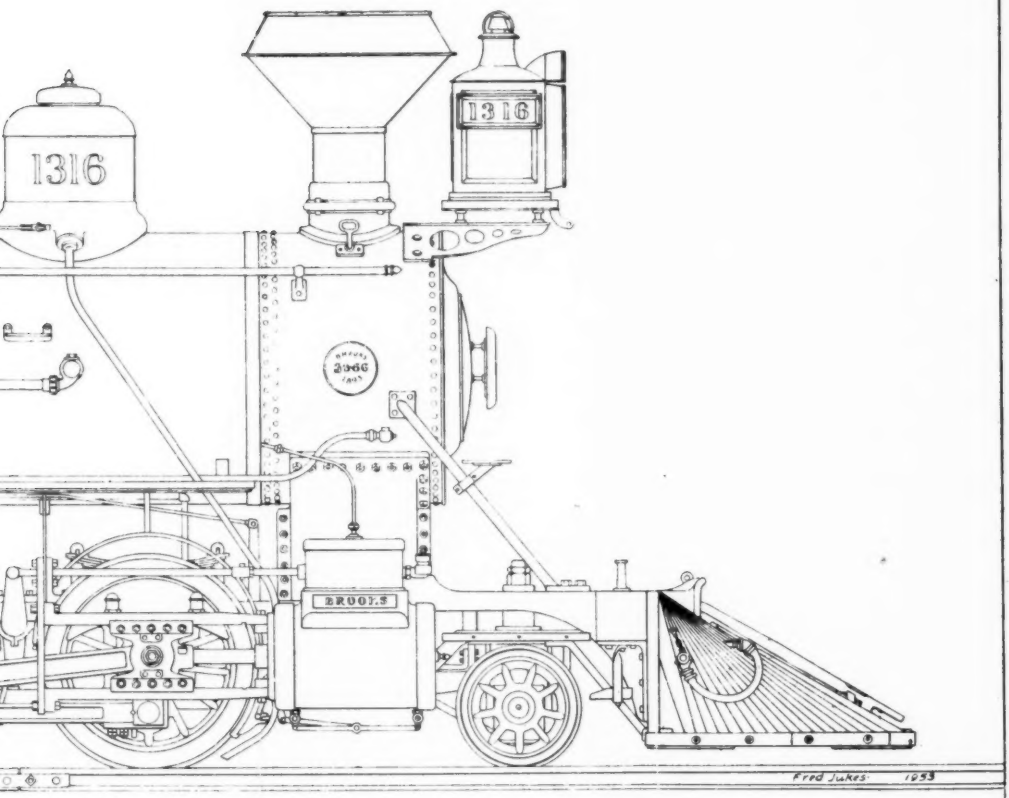
Tarrell, Supt of Motive Power



CONSOLIDATION
LOCOMOTIVE
1893

J. H. McConnell, Supt of Motive Power


1316
1316
BROOKS
Fred Jukes 1953

Union Pacific No. 1502 was another one of eight locomotives built by Brooks in 4/1899, construction No. 3213, 21x30″ cylinders, 57″ drivers and, subsequently renumbered 1802.

Union Pacific No. 1807 was photographed at Green River, Wyoming in 1900. "Bob" Turner of Rawlins stands between the drivers with his long nose oil can and Castle Rock forms the background. This was one of seventeen locomotives built by the New York L. W. in 1890 with 20x24″ cylinders and 72″ drivers. The drivers were subsequently reduced to 69″ and the engine was renumbered 1307.

It has been over fifty years since these engines were "new" but, in their day they represented the locomotives of the "McConnell era" and we are grateful to Mr. Jukes for his drawing and the photographs that have enabled us to make these illustrations.

Worth Reading

Compiled by ELIZABETH O. CULLEN, *Librarian,*

Bureau of Railway Economics, Association of American Railroads,

Washington 6, D. C.

Books and Pamphlets

An Atomic Locomotive—a Feasibility Study, by G. K. Abel, L. B. Borst, D. M. Bowie, K. W. Petty, B. J. Stover, M. A. Van Dilla. 54 proc. l., 1 chart. Salt Lake City, Utah, University of Utah, Department of Physics. Dated January 1, 1954. " . . . It is appropriate that such an investigation be carried out at the University of Utah, since Salt Lake City is an important rail junction of the western United States. . . . Since no member of the group had relevant rail experience, a number of organizations were approached, all of which agreed to cooperate by providing information. Among them were the four major railroads operating out of Salt Lake: The Southern Pacific, The Union Pacific, The Western Pacific and the Denver and Rio Grande Western. Because of the interest in atomic rail propulsion shown by the New York Central System, they were included. The Association of American Railroads agreed to cooperate. Additional assistance was needed on the engineering design aspect of the problem. The Electro-Motive Division of General Motors Corp. has shown unusual willingness to assist in the study. Babcock and Wilcox and General Electric have responded to requests for estimates on individual pieces of equipment. The reader must remember that this is by no means a complete and self-sufficient engineering study. . . . The present study is directed toward finding a sound technical design capable of execution within the framework of existing technology. . . " pp. 3-4. Summaries in Railway Age, Feb. 15, 1954, p. 3; Feb. 22, p. 15; Railway Gazette, London, England, Feb. 19, 1954, p. 200.

The Big Book of Real Streamliners, by George J. Zaffo. 24 p. Illus. New York, Grosset & Dunlap. $1.00. From the "Best Friend of Charleston" to the dome cars, in colored pictures and diagrams. Text by Scott Stewart.

Books and Pamphlets relating to Canadian Railways in Libraries in Montreal—a Trial Bibliography, compiled by Helene A. Dechief, and available on request to her at Ecole des Bibliothecaires, Université de Montreal, P. Q., Canada. viii, 118 proc. p.

A Chronology of American Railroads Including Mileage by States [1830-1951] *and by Years* [1830-1951], compiled by and free on request to Association of American Railroads, Transportation Bldg., Washington 6, D. C. cover-title, 10 p. "Growth of the United States of America during First Century of Railway Era (Compiled from U. S. Government Report)" p. 9.

Consolidated Index of Proceedings, Vol. 40, 1941 to Vol. 54, 1953, Incl. and beginning on page 43 Index of Monographs, Reprints and

Special Features which appeared in the Bulletins of the Association 1940-1953, but not in the Proceedings, compiled and published by American Railway Engineering Association, 59 E. Van Buren St., Chicago 5, Ill. 44 p. "Golden Jubilee Yearbook [Index], Bulletin 480, March 1949" p. 44.

The Crookedest Railroad in the World—A History of the Mt. Tamalpais and Muir Woods Railroad of California, by Theodore G. Wurm and Alvin C. Graves. 121 p. incl. map, illus. diagrs. Fresno, California, Academy Library Guild. $3.75.

The Development of the Railway Network of Southwestern Ontario to 1876, by James J. Talman, Univ. of Western Ontario. 8 p. Reprint from Canadian Historical Association [Proceedings], 1953. Bibliographical footnotes.

Famous Railroad Stations of the World, by Adele Gutman Nathan with W. C. Baker. Illustrated by Graham Bernbach. 100 p. New York, Random House. $1.75.

Fifty Million Acres: Conflicts over Kansas Land Policy, 1854-1890, by Paul Wallace Gates. xiii. 311 p. illus. Ithaca, N. Y. Cornell University Press. $4.50. " . . . Kansas was selected for the study because the story of its development involves analysis of a complex maze of inconsistent and badly-drawn legislation complicated by blundering, stupid and corrupt administration. . . . Particular attention is paid . . . to the treaty method of disposing of Indian lands, to land grants to railroads, and to the sales, settlement, and tax policies of these railroads . . . " p. vi.

Finding List of Canadian Railway Companies before 1915, compiled by Noel G. Butlin. Cover-title 31 p. Published by and free on request to Baker Library, Graduate School of Business Administration, Harvard Univ., Boston 63, Mass. and Bureau of Railway Economics Library, A.A.R., Washington 6, D. C.

Freight Commodity Statistics Classification 1954 Edition. Effective January 1, 1954, ix. 213 p. Washington 6, D. C., Association of American Railroads. Accounting Division, Transportation Bldg. $1.00. "Alphabetical List of Articles . . . " begins with '531 Abietic acid' and ends with '527 Zirconium silicate, noibn' pp. 1 and 143.

Fundamentals of Flashing of Diesel-electric Motors and Generators, by C. A. Atwell. 11 p. illus. New York 18, N. Y., American Institute of Electrical Engineers. 30 cents to members; 60 cents to non-members. " . . .Flashing has been considered by many persons as mysterious, because like lightning it occurs suddenly and often when least expected. There are several kinds . . . " p. 1.

The Geographical Basis of the Regions of Southwestern Ontario, by R. W. Packer, Univ. of Western Ontario. 8 p. Bibliographical footnotes. Reprint from The Canadian Historical Association [Proceedings] 1953. " . . . The physical build of the area presents an interesting contrast between the very old and the very new. The underlying solid rock was laid down in the seas of the Paleozoic Era. . . There appear to be six major industrial regions . . . Windsor . . . Sarnia . . . Chatham-Wallaceburg . . . central counties, . . . valley of the Grand River and

its tributaries . . . Welland Canal complex . . . " pp. 1, 3-5.

The Gulf, Mobile and Ohio: A Railroad That Had to Expand or Expire, by James H. Lemly. viii, 347 p. illus., ports. (part col.) maps. Homewood, Ill., R. D. Irwin. $5.00. Bibliography pp. 337-340. Indiana University School of Business study no. 36. " . . . covers the entire growth of the System from 1920 to the present . . . "

Gulf to Rockies—The Heritage of the Fort Worth and Denver—Colorado and Southern Railways, 1861-1898, by Richard C. Overton. With pen sketches by Reginald Marsh. xiii, 410 p. illus., maps, charts. Austin, Texas, University of Texas Press. $5.00.

Indian Railways—One Hundred Years 1853 to 1953, by J. N. Sahni. vi. 200 p., illus., maps on front and back covers. New Delhi, India, Ministry of Railways (Railway Board), Government of India. *Indian Railways Centenary* Exhibition, New Delhi, 1953. 136 p. illus., plan, map, also issued by Railway Board.

International Railway Statistics—year 1952—English and French edition. 159 p. each. Paris 7, France, International Railway Union, 10 Rue de Prony.

Henry Villard (1835-1900) and the Northern Pacific, by Robert S. Macfarlane, president, The Northern Pacific Ry. Co. 28 p. " . . . career of a German immigrant who completed America's first northern transcontinental railroad . . . " Address at New York, Jan. 27, 1954, before The Newcomen Society in North America.

Highlights of American Railroad History. Illustrations by Lary Gaynor. 28 p. Washington 6, D. C., Association of American Railroads, Transportation Bldg., " . . . seventy-two outstanding incidents [grouped in the months in which each happened] were selected for pictorial treatment. . . "

Locomotives and Trains of Kansas City Southern and Louisiana & Arkansas Railways, by A. E. Brown. 67 p. of photographs by the author— " . . . steam locomotives and their trains . . . from 1931 to 1952 . . . " Leesville, Louisiana, A. E. Brown, 904 Dennis St. $4.95.

A Manual of the William Freeman Myrick Goss Library of the History of Engineering 1946-1953, by William Murray Hepburn. 60 p. Supplement to Manual . . . 1928 to 1946, published in 1947. Lafayette, Indiana, Purdue University Engineering Experiment Station. "Railroads, U. S. and General," pp. 26-28; "Specific Countries and Areas" pp. 28-31; "Great Britain" pp. 31-32; "Other Countries" p. 32; "Locomotives" p. 33. Foreword mentions: " . . . This library stands ready now to serve anyone who wishes to use it. . . . " p. 7. *The Library Moves To New Quarters* " . . . in the new offices of the Dean of Engineering on the ground floor of the Engineering Building . . . " by W. E. Howland, pp. 13-14. Illus.

Mexico—One Hundred Years of Railroading. 4 p. Map. Mexico, D. F., Mexico, National Railways of Mexico, Bolivar No. 19. Free on request. "Over 8,300 miles of modern railroad ship to (or from) Mexico via National Railways of Mexico. Map shows "Main rail routes connecting Mexico with the United States."

The New Ore Pier of the Pennsylvania Railroad at Philadelphia. Descriptive brochure. Philadelphia 4, Penna., The Pennsylvania Railroad. *Pennsylvania Railroad's New Ore Pier Goes Into Operation at Philadelphia.* "last month" *(In its* The Mutual Magazine, April 1953, front cover and pp. 3-6. Illus.)

" . . . Our Work in the Railway Passenger Car Field . . . " by Edward G. Budd, Jr. Address to New York Society of Security Analysts, Feb. 19, 1954. Philadelphia 32, Penna., The Budd Co. 8 p.

Overseas Railways 1953—A Railway Gazette publication. London, England, The Railway Gazette, 33 Tothill St., Westminster S. W. 1. 7 shillings 6 pence. Cover-title, 232 p. illus., maps, tables. " . . . As described in this sixth edition . . . important new lines are projected or under construction, some dictated by altered traffic flows in consequence of territorial changes, as in India and Pakistan, but most prompted by the need to tap new areas of industrial and agricultural production, unite neighbouring systems, provide new outlets to the sea, shorten roundabout routes, or improve the carrying capacity of existing lines. . . . "

Piedmont Prodigy . . . The Story of the Piedmont and Northern Railway, by Thomas G. Lynch. 28 p. illus. Charlotte, N. C., The Piedmont & Northern Railway Co., March 1954.

QUIZ on Railroads and Railroading—10th Edition, December 1953, 312 questions and answers. illus. Washington 6, D. C., Association of American Railroads. Free on request.

Rail Oddities—Odd and Interesting Facts About the Railroads. 30 p. illus., Washington 6, D. C., Association of American Railroads. Free on request.

Railroad Leaders 1845-1890—The Business Mind in Action, by Thomas C. Cochran. xii, 564 p. incl. maps. Cambridge, Mass., Harvard University Press. $7.50. " . . . we were able to see, at least, the letter files of men who were presidents of roads in all sections of the country except the extreme Southeast and Southwest . . . letter files for sixty-one men who were the chief managing executives at some time in their careers . . . " (p. 3). *Biographical Data and Correspondence* pp. 231-501.

Railroad Photos Old and New, by Association of American Railroads. Public Relations Department. Photograph Service, Transportation Bldg., Washington 6, D. C. 16 p. Free on request. " . . . prepared for the use of writers, editors, publishers, layout men, commercial artists, television producers and others who might have need of photographs to illustrate material concerning America's railroads and their daily work. . . . available for professional purposes. . . . free of charge. . . . "

Railroading, by Boy Scouts of America. Merit Badge Series 1954. No. 3292, written by G. S. Ripley. 90 p. illus. Single copies free on request to Association of American Railroads, Transportation Bldg., Washington 6. D. C. *Requirements* for Railroading merit badge pp. [ii-iii].

Railroading with the Woman's Viewpoint, by Olive W. Dennis, retired research engineer B&O R. R. Address before The Society of Women Engineers National Convention, Mayflower Hotel, Washington, D. C., March 6, 1954. 11 mimeo. 1. Boston, Mass., Society of Women Engineers, c/o Miss Margaret Ross, corresponding secretary, 258 Commonwealth Ave., Boston 16, Mass. " . . . no one has more authentic information on what suits the woman's viewpoint than a woman herself. . . . I believe that I am the only member of the Society . . . who has a connection with a specific railroad. Possibly graduate women engineers are loath to devote their strictly engineering skill to the details of general improvements in railroad service . . . "

Railroads In Defense and War—A Bibliography, compiled by Helen R. Richardson, reference librarian. viii, 226 p. incl. Index. Washington 6, D. C., Bureau of Railway Economics Library, Association of American Railroads. Free on request. Libraries checked pp. v-vi, viii. *Part I. Books, reports etc.:* General References; Sec. A. United States 1828-1953; Sec. B. Other Countries. *Part II. Association proceedings, club proceedings, shippers advisory board proceedings, and periodicals:* Sec. A. United States; Sec. B. Other Countries. Appendix. Publications of National Defense Transportation Association, and U.S. DTA; FCDA; ODM; ODT and WPB.

Railroads of New York—A Study of Government Aid 1826-1875, by Henry H. Pierce. xiii, 208 p. maps, charts, tables, bibliographical index. Cambridge, Mass., Harvard University Pres. $3.00 " . . . essentially a study of the part played by the state and its municipalities in financing the construction of New York railroads."

Railwaymen's Gallery, by Roger Lloyd. 166 p. illus., London, England, George Allen & Unwin Ltd., 12 shillings 6 pence. *Ch. I Pioneers! O Pioneers!* " . . . Railways, then, were new in the sense that no legislative or managerial precedent could rightly be applied to them; they were irrelevant to all previous history and had to create their own . . ." (p. 13). *Ch. 2 The Old English Navvy.* " . . . who built the lines . . . The navvies always worked in gangs, and each 'butty' gang as a rough-and-ready self-governing democracy. They would brook no foreman or overseers. . . ." (p. 36) *Ch. 3. The Decline and Fall of the Euston Empire, 1848-1858.* Capt. Mark Huish and Sir Richard Moon, some stockholders and others. *Ch. 4. Portrait of A Victorian Railway.* " . . . L.N.W.R. . . . " *Ch. 5. The Railway Towns.* " . . . one of the most exciting ventures which the new railway companies found themselves compelled to undertake . . . They had not expected it, they did not want it, but if their trains were to continue to run and the service to expand, they found that they could not help themselves. . . . The most important . . . were Crewe, Swindon, Doncaster, with Wolverton as a kind of pocket borough of the species . . ." *Ch. 6 The Highland Railway At War, 1939-1945.* "On no British railway does the burden and strain of war fall more heavily than on the group of lines which run north from Perth to Inverness and Thurso and west from Bingwall

to the Kyle of Lochalsh. These lines formed the Old Highland Railway. . . . " *Ch. 7. Behind the Christmas Scenes at Crewe. Ch. 8. A Railwayman's View of the Highlands.*

A Re-Appraisal of the Economics of Railway Electrification—How, When and Where It Can Compete with the Diesel-Electric Locomotive? by H. F. Brown and R. L. Kimball. New York 18, N. Y., American Institute of Electrical Engineers. 60 cents.

Rectifier Motive Power—Inductive Co-ordination Considerations, by E. B. King, K. H. Gordon, and L. J. Hibbard. 15 p. New York 18, N. Y., American Institute of Electrical Engineers. 60 cents.

Report on Reorganization of the Alaska Railroad. Nov. 23, 1953, by U. S. Department of the Interior, Washington 25, D. C. [17] 1. Accompanied by "Approval Notice" and made public Feb. 9, 1954. Prepared by Thomas Balmer, Henry C. Munson, Henry K. Bougan, and Donald H. Miller. Summary in Traffic World, Feb. 27, 1954, p. 19.

A Review of Railway Operations in 1953, by J. Elmer Monroe. 64 pp. Reprinted from Railway Age Review and Outlook Number, Jan. 11, 1954, with revision of statistics to April 15, 1954, as Special Series Bulletin No. 88, Bureau of Railway Economics, Association of American Railroads, Washington 6, D. C. Free on request.

Rhodesia Railways, by Rhodesia Railways, P. O. Box 596, Bulawayo, Rhodesia, Africa. 16 p. ills., map. Free on request.

The Salvation of the Railroads—A message written especially for the attorneys, doctors and other members of the Law Department of the Louisville and Nashville Railroad Company, by W. L. Grubbs, vice president and general counsel. 52 p. Louisville, Ky., L. & N. RR. Co. " . . . No one supposes we can at once, or in a short time, right all the wrongs I have recorded, but certainly it is time for those interested in the railroads and in their Country to roll up their sleeves to do what can be done to check and to turn back the tide that has been running so strongly against the railroads. Specifically my seven-fold answer to the foregoing question ["What Can We Do?] is: . . . " pp. 48-52.

Sidelights on the Founding of the Baltimore and Ohio Railroad, by Alfred R. James. Reprinted from Maryland Historical Magazine, December 1953, pp. 267-309. Illus.

Some Application Phases of the Ignitron Rectifier Locomotives of The Pennsylvania Railroad, by F. D. Brown. 11 p. New York 18, N. Y., American Institute of Electrical Engineers. 60 cents.

[Spanish] *Anuario de Ferrocarriles y Transportes Regulares por Carretera 1950-1953,* compiled by Instituto del Transporte, Madrid, Spain, under the direction of Alfonso Imedio Diaz, director. 586 p. Price: 100 pesetas. Contains names and addresses of Spanish ministries and their officials that regulate transport; of officials of RENFE [Spanish National Rys.]; of official organizations relating to railroads; to highway transport; railroad union, and other organizations interested in railroads. Statistics of railroads, highway transport, and tramways, pp. 530-555. Legislation on transport 1950-1953, pp. 557-567. Bibliography on land transport, pp. 569-586, arranged by countries.

The Story of Ohio's Railroads, by Special Transport Committee, Railroads of Ohio. Room 1014, 16 E. Broad St., Columbus 15, Ohio. " . . . The Railroads serving the State of Ohio publish this booklet to join in doing honor to this great State in the One Hundred and Fiftieth Year of its history."

Trailers-On-Flat-Cars—"Piggy Backs"—Memorandum Listing Material on History of Service 1926-1953—REVISED to February 2, 1954, by Elizabeth O. Cullen, librarian, Bureau of Railway Economics Library. 79 proc. p. including Index. Washington 6, D. C. Association of American Railroads. BRE Library. Free on request.

Trains Annual 1953, edited by Cecil J. Allen. 96 p. illus. part in color. London, England, Ian Allen Ltd. 6 shillings 9 pence. "With the seventh consecutive appearance of 'Trains Annual' we have passed from the status of a mere innovation to what, we believe, has become with many readers an institution. Once again we are able to present a very varied programme of railway matters, both in Great Britain and overseas . . . "

Transformation In Transport, by Lewis K. Sillcox. New York, 17, The New York Air Brake Co., 230 Park Ave. Free on request. Address before Rail Transportation Institute, American University, Washington, D. C., March 3, 1954.

A Treasury of Railroad Folklore—The Stories, Tall Tales, Traditions, Ballads and Songs of the American Railroad Man, edited by B. A. Botkin and Alvin F. Harlow. New York, Crown Publishers, Inc. $4.00.

2750: Legend of a Locomotive, by Harry Webster. Illustrated by R. Barnard Way. xii, 209 p. Edinburg 9, Scotland, Thomas Nelson and Sons, Ltd. 8 shilling, 6 pence. The heroine of this legend is an ex-London & North Eastern Class A Pacific locomotive, a "Super-Pacific."

Victory Rode The Rails; The Strategic Place of the Railroads in the Civil War, by George Edgar Turner. Maps by George Richard Turner. [1st edition]. 914 p., illus., ports., maps. Indianapolis, Ind., Bobbs-Merrill. $4.50.

Wheels and Axles on Diesel Locomotives (with resulting effects on rails & structures), by Electro-Motive Division, General Motors Corporation, LaGrange, Illinois. 30 p. Illus., diagrs. "The library of technical knowledge concerning wheels and axles as applied to railroad locomotives was assembled and recorded during the days of the steam locomotive. While much of the data is applicable to the Diesel-electric locomotive, other data which have been applied to it develop false conclusions. In addition, many areas exist where accurate factual information has been totally lacking. It is the purpose of this paper to relate the accepted data to the requirement of wheels and axles for Diesel-electric locomotive performance, to supply as much new data as is available, and to indicate the known effects of the stresses transmitted by such wheels and axles to rail and structure."—Introduction, p. 1.

William C. Dickerman (1874-1946)—Locomotive Builder, Scholar, Citizen—Never His Courage Faltered, by Charles Penrose. 24 p. A.

Newcomen Address delivered in New York City, Jan. 4, 1951, published 1953.

The Year's Work—A Summary of the Annual Report of the Association of American Railroads, November 1952—October, 1953. Signed: William T. Faricy [president]. Cover-title, 7 p. Washington 6, D. C., A.A.R., Transportation Building. Free on request.

Articles in Periodicals

Atlantic-Council Bluffs Chord Line, C. R. I. & P. RR. Through Route from Chicago to Omaha Shortened. The Railway Gazette, London, Eng., March 19, 1954, p. 322. "Map showing the new chord, original, and connecting lines . . . " *see also* in this list "7,000,000 Yards Moved . . . "

Beyer Peacock Centenary of locomotive construction. The Railway Gazette, London, England, February 19, 1954. p. 199.

The Brazil-Bolivia Railway. The Railway Gazette, London, Eng., March 12, 1954, p. 294. Map. " . . . important link completed of a through route between Central Bolivia and the Atlantic."

Building the Overseas Railway to Key West, by Carlton J. Corliss. Tequesta—The Journal of the Historical Association of Southern Florida, Miami 4, Florida. No. 13, 1953, pp. 3-21. Map.

C. N. R. Receives First Passenger Cars of $59 Million Order. Canadian Transportation, April 1954, pp. 183-189. Floor plan, sleeping car.

C. P. R. Lubricating Oil Reclamation Plant At the St. Luc Freight Terminal, on the outskirts of Montreal . . . Canadian Transportation, April 1954, p. 193. Illus.

The Case for Staggering—Problem in the Metropolis, by Ernest Davis, M.P. Modern Transport, London, England, Feb. 27, 1954, p. 3; March 13, 1954, p. 6. Chart and illus. "Rush hour traffic in London and many provincial cities gets worse . . . What Can Be Done? . . . Alleviation in my view can only come from the staggering of working hours, . . . "

China—The New Empire Builders. Time, March 1, 1954, pp. 26-27. Includes Map showing existing railroads, Communist built; projected; roads under construction. " . . . Red China and the Soviet Union are now building Sun Yat-Sen's railroads, with a notably different purpose. They mean, by 1957, to bring Communist power by rail into Asia's heartland . . . And when the new Red rail network is complete, the two partners will be able to deploy Russian troops (or equipment) in South and Southeast Asia, or Red Chinese troops (or slave laborers) into Europe."

Communication on the Railroads, by Leo J. Ritter. Signal—Journal of the Armed Forces Communication Association, March-April 1954, p. 14-16. Illus. " . . . electrical communication . . . in the development of freight and passenger transportation. . . . "

Continental Traffic—A Look Forward, by L. H. K. Neil. Modern Transport, March 13, 1954, p. 15. Editorial comment: "Cross-channel Travel—All types needed for freight."

Continental Traffic—The Rail-Sea-Air Problem, by R. E. Sinfield. Modern Transport, February 27, 1954, p. 5.

European Transport Picture. Modern Transport, January 23, 1954, p. 2.

The Fairer Side of Railroading, by John T. Cunningham. A.C.F. Wheels, January-February 1954, pp. 1-7. illus. and ports. of women railroad officials and women at work on railroads. " . . . Women now do just about everything, from running the entire railway to working as laborers on coal and ore docks. . . . "

The Gas Turbine: Its Impact on Civil Aviation, by Sir Miles Thomas. Modern Transport, February 13, 1954, p. 3.

[*Gas-Turbine Locomotives—A Report of the work done during 1953*], by Locomotive Development Committee, Bituminous Coal Research, Inc. and American Locomotive Company. Statement prepared by John I. Yellott and Peter R. Broadley, director and assistant director of research. "Condensed form" in Railway Age, April 19, 1943, pp. 44-47. Diagrs. and illus. Presented on March 23, 1954 at a conference of Bituminous Coal Research, Cleveland, Ohio.

Gas Turbines And the Motive Power Problem, by P. A. McGee. Railway Locomotives and Cars, February 1954, pp. 47-51,61. Tables and charts.

Here's A Revolution In Passenger Train Design—Two New German Luxury Trains Built According to Aircraft Principles Shatter the Illusion That Light Weight Impairs Passenger Safety or Riding Qualities. Part I-II, by Herman Bleibtreu. Railway Age, March 15, 1954, pp. 62-64; March 29, 1954, pp. 10-12,18. Illus., diagrs., plans. "Two new seven-car trains . . . have been installed on a 530-mile run between Germany and Switzerland. . . . "

The History, Development, Operation and Performance of Diesel Locomotives on the Sante Fe Railway, by T. T. Blickle. Pacific Railway Club Proceedings, October 16, 1953, pp. 9-18.

How The U. S. KEEPS THINGS MOVING—Has Its Transport Policy Kept Pace With Jets and Diesels? Or Does It Need General or Specific Overhauling In 1954? Congressional Quarterly Weekly Report —Week Ending Jan. 8, 1954, pp. 17-24.

Industry's Metamorphosis—ACF's Plan for New Name Typifies Changes In Rail Equipment Field. The Wall Street Journal, March 23, 1954, p. 6.

Iron Ore Deposits In Venezuela, by W. W. Wanamaker, chief engineer, Orinoco Mining Co. Midwest Engineer, November 1954, pp. 3-4, 12-15. " . . . The ore, . . . is to be mined with power shovels, loaded into dump trucks, and dumped from ore trucks into railroad cars at top of the hill. Single rail tracks, 88 miles long, are being constructed from the top of the mountain to Puerto Ordaz, the junction of the Orinoco and Caroni Rivers. The tracks have their predominate grade favoring the load. At Puerto Ordaz, the ore is to be transferred from the railroad cars by means of a car dumper and will pass through crushers to a belt conveyor system which will deliver it to a stockpile.

From there a reclaiming system will remove the ore and load it directly into ocean-going vessels at dock side. . . . " p. 4.

Labrador Iron Development, by J. H. Miller, chief mechanical engineer, Quebec, North Shore & Labrador Ry. Co. Canadian Railway Club Proceedings, Meeting of October 19, 1953, pp. 42-54. *Reprinted* with illustrations showing and work trains of Q., N. S. & L. Ry., in Canadian Transportation, November 1953, pp. 609-614. " . . . After loading into cars the ore will be hauled 306 miles by rail to Seven Islands for loading into ships. The railway is the largest and most expensive portion of the whole development . . . "

London Transport Progress and Prospects. Modern Transport, February 13, 1954, p. 2. Editorial summary and comment on L. C. Hawkins' address "this week" to British Railways (Western Region) London Lecture and Debating Society.

New Line Taps Ore Deposits—New Railroad, 144 Miles Long, Through Rugged Terrain Provides Outlet For Nickel and Copper Concentrates Found at Lynn Lake, Manitoba. Railway Age, February 22, 1954, pp. 54-56. Map and illus.

1953—The Year in Pictures . . . Panamericana and Piggy Back—A glance over the events of 1954 puts the coming year in the light of great promise . . . , by Arthur M. Cox, Jr. Railway Age Review and Outlook Number, January 11, 1954, pp. 133-145.

On the Q N S & L They're Ballasting Track at 56 Below. Railway Age, March 29, 1954, p. 20. Illus. " . . . To reach the goal of 'Ore by '54' . . . "

Pittsburgh & Lake Erie Marks 75 Birthday. On Feb. 24. New York Central System Headlight, March 1954, p. 11. Illus.

Railway Civil Engineering in the U. S. A., by I. C. Campbell and N. J. Nicholls. Paper at Institution of Civil Engineering, London, Feb. 23, 1954. Editorial summary in The Railway Gazette, March 19, 1954, p. 317. "A year's experience on U. S. A. railways enjoyed by two British railway engineers, and their views upon American practice as they found it, are embodied in the paper. . . . "

Railways in 1854. The Railway Gazette, January 1, 1954, *Vol. 100, No. 1,* pp. 4-5. " . . . The year saw the opening of the first railways in Australia, Brazil, and Norway, and considerable expansion in Canada and India. . . . The first use of railways as an arm of military operations between first class powers was in the Crimean War . . . "

RENAISSANCE OF THE RAILS—Roads' $8 billion modernizing program involves devices like giant ditch reamers, herculean tie yankers, automatic ballast cleaners, electronic humps, clickless tracks—Photographed for Life by Albert Fenn. LIFE, Nov. 23, 1953, pp. 115-123.

A Report on Progress In Railway Mechanical Engineering—1952-1953. Mechanical Engineering, March 1954, pp. 236-247; April, pp. 334-342. Illus. and diagrs.

7,000,000 YARDS MOVED on Rock Island's Atlantic cut-off, by Caterpillar Tractor Co., Peoria, Illinois. Its advertisement, Railway Age, February 22, 1954, p. 8. Illustration "Typical terrain on the

route of the cut-off . . . " "In September, 1953, the final spike was driven on the Atlantic-Council Bluffs cut-off of the Rock Island Lines. The new route was originally recommended by General Grenville M. Dodge in 1857, but because of the immense cut-and-fill operations involved, the task had to wait for modern earthmoving machines. . . . But Cat* DW21 and DW20 Tractors and Scrapers did the job, with D8s as pushers. . . . "

6the Annual Motive Power Survey, by David P. Morgan. Trains, May 1954, pp. 48-53 Illus. "Nobody wanted a steam locomotive for the first time in 125 years. Otherwise in 1953, the hood unit kept on throwing its weight around, and a Utah Professor took a look up the track."

Sixteenth International Railway Congress, London, England, May 19-26, 1954, *Summaries of Reports* to be made and discussed. The Railway Gazette, in each issue from January 22, 1954 on, under caption above. Editorial comment in March 26th issue, p. 341, mentions: " . . . When the first International Railway Congress to be held in Great Britain since 1925 meets in London on May 19-26, over 450 delegates from more than 30 different countries will meet in Church House, Westminster, to discuss current railway problems and latest techniques."

67m, 50 par seconde! . . . Un record envié de tous: celui de la vitesse pure, by Y. M. T. La Vie du Rail—Notre Métier No. 439, 21 March 1954, front cover (in color) and pp. 3-7. *see also: The French Railway Speed Record . . .* The Railway Gazette, March 26, 1954, p. 352, and *The World's Fastest Train.* Trains, May 1954, p. 12.

The Story of Speed . . . the boost in gait from "going like sixty" to streamliners—and . . . who's fastest for 1954, by Donald M. Steffee. Trains, May 1954, pp. 22-30. Illus. and tables. " . . . How fast is train travel today? For the answer we need only study the tables that accompany this article. The first of these sets forth in detail all runs on American railroads timed at 75 miles an hour or better. . . The last table shows the aggregate mileage contributed by the three major types of motive power at speed ranges varying from 60 to 80 miles an hour or over. . . . " p. 27.

Toronto Subway in Operation. Canadian Transportation, April, 1954, p. 227. "The ceremony to mark the inauguration of service . . . March 30 . . . "

Trains of the Navy, by Lt. jg. F. J. Allston, Jr. Monthly Newsletter, The Bureau of Supplies and Accounts, Navy Department, March 1954, pp. 35-41. Illus. " . . . The Navy is in the railroad business in a big way—in a bigger way than many Class I railroads. . . . Naval activities throughout the United States which utilize a railroad operation . . . "

Transportation: Who'll Be Carrying The Load—and Why? Business Week, March 20, 1954, pp. 102-119. "Who'll carry the freight?"

Triple-Car Trains in Portugal. Diesel Railway Traction, London, England, January 1954, pp. 5-6. Illus., diagr. " . . . Italian-built diesel-mechanical air-conditioned sets with 5.7 b.h.p. per ton of tare."

Truck Turnabout—Many Highway Carriers Lose Traffic to Rails, Reversing Long Trend—Railroad Rate Cuts Blamed; More Are in The Works; Many Truckers Go In Red—The Case of Barney Cushman, by Ray Vickers, staff reporter, Chicago. The Wall Street Journal, April 19, 1954, pp. 1,8. " . . . Behind the shift are recent rail freight rate slashes on a long list of goods ranging from aluminum to whiskey. Varying from a few percentage points to 40%, they have been selective rather than general . . . And now further reductions seem in the offing. . . . " p. 1.

The Unique Job of the Railroad Carman, by W. M. Keller, director of mechanical research, A.A.R. The Car Foremen's Association of Chicago. Official Proceedings, December 1953, pp. 19-25. " . . . The car foreman is a man of many abilities, all of which are essential to the proper handling of his job. He does many things for which there are no instructions or 'directions on the package. He employs both the arts and the sciences in discharging his duties. . . . Moreover, he does his work regardless of snow, heat, and gloom of night. I have read hero stories of soldiers, lawyers, politicians, cowboys, doctors, but any good story writer could get a magnificent story if he had the fortitude to spend a few days with a car repairman and his foreman . . . " pp. 20-21.

New Books

Railroad Leaders, 1845-1890, by Thomas C. Cochran. 564 pages, 9¼x6. Published by Harvard University Press, Cambridge, Mass. Price $7.50.

This is a pioneer book in this field and is destined to become a classic. The publisher rightfully claims that it is the first systematic presentation of the ideas and attitudes of a homogeneous group of American business men—leaders in the formative years of the American railroad. The primary purpose of this book is to describe, analyze and compare the ideas and attitudes of sixty-one leaders who made the important decisions on the ten railroads considered. Such men as John Murray Forbs, John W. Brooks, James C. Clark, Stuyvesant Fish are a few of these men while such roads as the C. B. & Q.; Illinois Central and New York Central are a few of the roads considered. The executive correspondence furnishes the basis of this book and nearly 250 pages in the appendix are given over to the reproduction of these letters. Such source material cannot be questioned. Its value cannot be estimated. True, this work is in no sense a railroad history tho' the maps are of great value in placing the locale of this study. But we must remember that it was men that directed these railroad enterprises and after all, the study of human nature should be paramount to that of corporations or machines. The book presents solid evidence of the basic ideas which aided the railroad policy of at least ten of our railroads and the sixty-one men that directed the policies. The author does not label his findings as positive, it is your privilege to disagree with him but you can't help respect them nor fail to appreciate the vast amount of research that went into the preparation of the book. Like a gentle breeze on a hot summer day, this book is refreshingly different from anything that has ever been published in this field, and because of this, the author has our commendation and we may express the hope that more along these lines will be published. Any real railway historian will take pride in owning a copy.

Gulf to Rockies, by Richard C. Overton. 410 pages, 9¼x6, illustrations and maps. Published by University of Texas Press, Austin (12), Texas. Price $5.00.

This is the history of the Colorado & Southern Ry. and the railroads that went into the formation of this railroad and covers the period from 1861-1898. The building of a railroad from Denver to some point in the Gulf of Mexico originated with and was started by John Evans, former Governor of Colorado. Denver and the entire state was held pretty much in the grip of the east and west railroads and it was to break this monopoly that Evans made his initial start. Meanwhile, certain ambitious citizens of Fort Worth had incorporated the Fort Worth and Denver City R. R. in 1873 but it was not until Gen. Grenville M. Dodge stepped into the picture and joined forces with Evans that the route was built. For a time the road was under Union Pacific

control but was freed during the receivership of the latter whence it emerged as the Colorado & Southern, the conclusion of this history.

I think the greatest service the author has done in this book is in his portraying the role played by General Dodge. To many of us, we know that he was the builder of the Union Pacific and after that he seems to step out of our minds. True, Norwich University, his alma mater, recently paid tribute to this distinguished graduate but the author, in his book has shown not his ability as an engineer but as a man, one that enjoyed the respect and confidence of all with whom he came in contact. To enjoy the respect of Jay Gould was something! Gov. Evans had his moments of distrust and had reasons for them, so he thought but that was because General Dodge had a far broader viewpoint. Through drought, depression, competition and during Union Pacific control, the General stood firmly by his road. The author has narrated his story in an easy and interesting fashion and it is a book that can easily be enjoyed

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A Treasury of Railroad Folklore by B. A. Botkin and Alvin F. Harlow. 530 pages, 8¼x5½. Published by Crown Publishers, Inc., New York, N. Y. Price $4.00.

This book, as the title implies, is a collection of railroadiana, from all walks of life. Here you will meet Peter Cooper, Commodore Vanderbilt, James J. Hill, Death Valley Scotty and even Jesse James. The stories include brass hats, brass buttons, gandy dancers and boomers. You'll find most of them within the covers of the book.

Whether you like the selection of the author depends on your viewpoint. This reviewer has always had a special fondness for Cy Warman, who was relegated to one incident but this does not destroy his appreciation for the entire work. Probably some won't like the inclusion of so many railroad songs. The only item, and it's a small one, this reviewer does not care for is the design of the paper jacket and that can be easily discarded. The last seventy pages appear under the title "Railroadiana" and contains such items and locomotive and train names; locomotives and their builders and the gage problem, much of which was taken from our publications.

Whatever your railroad interests are, this book is one that should always be at hand when a leisurely half hour or evening gives you an opportunity for reading. You can consult the index or pick at random and, you won't be disappointed. The stories improve on acquaintance and we hope this will not be the last one the authors will publish.

Famous Railroad Stations of the World, by Adle Gutman Nathan. 100 pages, 10x7⅝, illustrated. Published by Random House, New York, N. Y. Price $1.75.

In the short compass of this book, the reader is taken on a tour of the various railroad stations throughout the world, chiefly in this country and in Europe. The facts have been livened with fiction, such as the two men that hoisted themselves on top a chimney that they might wit-

ness the Duke of Wellington attend the opening of the Liverpool & Manchester R. R. and had to remain there that night. That genius Isambard Kingdom Brunel has not been overlooked nor has William J. Wilgus, builder of the Grand Central Terminal. Whether you are ten or fifty, you will find this book of interest.

This reviewer wishes he could be certain that the illustration shown of the St. Pancras Station, London, 1850, is authentic for that is certainly an American locomotive of the 1870's depicted in the print. Also the Liverpool and Manchester became a part of the London & North Western Ry. and the P. W. & B. was the Philadelphia, Wilmington & Baltimore R. R. Despite these minor errors, the book, as a whole, covers an interesting phase of our railroad history.

Great Trains of the World, by Wyatt Blassingame. 11x8, illustrated, some in color. Published by Random House, New York, N. Y. Price $1.00.

Designed for children, this book includes such trains as the "Century", "Flying Scotsman", "Orient Express", "Golden Arrow", "Super Chief" and others. It is written in simple style and in a straight forward manner and to those of us that number some "youngsters" of our acquaintance, who will probably grow up and never see the steam locomotive as we "oldsters" have, this book, as a present, might be the foundation of a start in the right step in our railroad history. After all, some one must follow in our footsteps.

Railwaymen's Gallery, by Roger Lloyd, 166 pages, 8½x5½, illustrated. Copies may be obtained from The Macmillan Co., 60 Fifth Ave., New York (11), N. Y. Price $3.00.

With the amalgamation of all lines into the British Railways, there have been published during the past few years many interesting and handsomely illustrated books either on the individual railroads or their locomotives. It has been the privilege of this reviewer to see many of them before being placed in the Baker Library and some of these authors have done a wonderful work with their form of presentation that some of us might emulate in this country.

This book does not belie the title for here the author has described his railway experiences, whether at Crewe or touring the Scottish Highlands. The book starts with the pioneers—George Stephenson and describes the railway navvies. There are the first thirty years of the London & North Western, first as the general manager and then as the traveler saw it. An account includes the building and development of many railway towns and concludes with the difficulties and the achievement of the Highland Ry. from 1939 to 1945. To this reviewer, the book had an appeal because it was so refreshingly different.

Railroads in Defense and War. 262 pages, 9x6. Published by the Association of American Railroads, Transportation Building, Washington (6), D. C. Free (to our members if the supply is not exhausted).

This is a bibliography and your editor is not going to attempt to review this work. Commencing with our own Civil War, the railroad has played an important part in the winning of any war—that we all know and realize. The subject matter, during all these years, is enormous. The work is divided into two parts—United States and other countries for Part I including books, reports, etc. Part II follows the same division but contains records of proceedings of associations, railroad clubs, etc. This simple division, thanks to the index, makes it easy to locate the information for any desired period. To Miss Helen R. Richardson, Reference Librarian, for "digging" up all of this material and to the Association of American Railroads, we want to express our heartfelt appreciation and gratitude..

True Adventures of Railroaders, by David Morgan, 209 pages, 7½x5, illustrated. Published by Little, Brown & Co., 34 Beacon St., Boston (6), Mass. Price $2.75.

This is a book of stories and the author has selected the ones relating to Casey Jones, the capture of the General, Death Valley Scotty and the Santa Fe and the building of the railroad over the great Salt Lake. The reason for this book is best expressed in the preface—it was the kind of a book that he wished he had had when he was a boy and, to that, this reviewer adds his—me too! These stories are all true stories of the railroad and the author has presented them in a straight forward manner, just as tho' he were telling them to you himself. Whether you like the one of the P. R. R. E-6s that raced from Washington to New York with the Lindbergh films and outdistanced the air planes or whether you admire that staunch heroine Kate Shelley of the C & N W makes little difference—they are all well told. It is hard for many of "oldsters" to realize that there will soon be a generation in this country that will have never seen a steam locomotive in actual service. I don't know of a better book to put in their hands than these well selected and well told stories. You may not have any of this generation in your immediate family but the boy in the next house or the next block, with his electric train could be a likely candidate. I rather think his Dad as well as yourself would enjoy these stories. Our member William A. Akin, Jr., has furnished some interesting sketches and, altogether, this is a book that one can honestly enjoy.

Minutes of Meetings

The Annual Meeting of the Railway & Locomotive Historical Society, Inc., was held at the Hotel Bellevue, Boston, Mass., at 2.30 P. M. on Sunday, May 2nd, 1954 with the following members present: Messrs. Becker, Cole, Fisher, Forsyth, Fogg, Graves, Greene, Harrison, Parker, Merrill, Schmid, Whitaker and Yungmeyer.

President Fisher was Chairman of the meeting.

The Secretary read the report of the last Annual Meeting, which was accepted.

Reports of the President and Treasurer were accepted as published.

The Committee on Chapter By-laws, represented by Mr. Yungmeyer, was submitted and referred to previous By-Laws committee for consideration and further report. Thanks of the Meeting were unanimously voted to Mr. Yungmeyer's committee.

Mr. Greene, our Financial Secretary, gave the Meeting an interesting discourse upon the operations of his office and several suggestions and comments were made thereon.

Mr Merrill, representing the Nominating Committee, offered the following names for the office of Directors, to serve until the Annual Meeting in 1957;

Dr. A. H. Cole
Harold D. Forsyth
D. W. Yungmeyer

Motion was made and unanimously voted that the Secretary cast one ballot for the above named and they were declared elected.

The meeting was then adjourned.

A true record

ATTEST Charles E. Fisher, President. Harold D. Forsyth, Secr.

At a meeting of the Directors, held immediately following the Annual Meeting of the members, on May 2nd, 1954, the following officers were elected:

PRESIDENT	Charles E. Fisher
VICE-PRESIDENT	D. W. Yungmeyer
TREASURER	George P. Becker
SECRETARY	Harold D. Forsyth
FINANCIAL SEC'Y	Howard F. Greene

The Directors unanimously accepted a resolution on the passing of Mr. Warren Jacobs, for many years our Secretary, which resolution is published elsewhere in the Bulletin.

The Directors extended Honorary Membership to Mr. Ralph Budd, in recognition of his long-standing friendliness and coöperation to the Society.

The directors established a Joint membership for husband and wife, living at one address at $6.00 per annum.

Clifford B. Burr

With the passing of Clifford Burr, many of us have lost a warm personal friend and the Society has lost one of its staunchest supporters.

With nothing more than a common school education, but with a will and a determination to study, he became one of the leading electrical engineers and contractors in the Naugatuck valley. Electricity was a growing infant at the time of his youth and he commenced by installing door bells and lighting gas by electricity in the homes in Derby, Shelton and Ansonia—some of the former are still in service. As an electrical contractor, no job was ever too small but that it was well done. His reputation for honesty and integrity in the three cities in which he worked was unequalled.

Although never a railroad man in the sense that he worked for a railroad, he was always interested in the locomotives and trains of the Housatonic, the Naugatuck, the New Haven & Derby all of which became a part of the New Haven. When this society was formed, he was one of the first dozen that took out a membership and he has worked to the best of his ability for its interests ever since. Altho' he was an ardent collector of photographs, he was also interested in all kinds of railroad data and, with access to certain railroad material of the New Haven, his last work was to build up a file of loose-leaf books relating to the operations of that road. Many of these were hand inscribed and many contain the original documents or letters. These are now in our files where they will serve as a lasting monument to his tireless efforts.

It was the privilege of your Editor to know Clifford Burr and his family very well. His willingness to help, his ready wit but best of all, he tried to and did practice his religion every day in the week—fifty two weeks in the year, made him in every sense a Christian.

In Memory of

Paul Berger
Annual Member
135 South LaSalle St., Chicago (3), Ill.
Who died on December 31, 1953

Lewis E. Jones
Annual Member
Groton, New York
Who died on March 24, 1953.

William B. Jones
Annual Member
6 Park St., Boston (10), Massachusetts
Who died on July 21, 1953

Franklin W. Krout
Annual Member
22 Stewart Ave., Nutley, New Jersey
Who died on December 14, 1953

B. S. Meyer
Annual Member
64 West Shiller St., Chicago (10), Illinois
Who died in 1953

Carleton W. Meyer
Annual Member
420 Lexington Ave., New York (17), N. Y.
Who died on February 16, 1953

W. J. Rivers
Annual Member
518 Ashby St., S. W., Atlanta, Georgia
Who died on February 26, 1954

David J. Welch
Annual Member
P. O. Box No. 396, Tracy, California
Who died on January 27, 1954

Resolution

Resolution Adopted at the Annual Meeting of The Railway and Locomotive Historical Society, at Boston, Massachusetts, May 2, 1954

WHEREAS: God, in His infinite providence has seen fit within the past twelvemonth to remove our friend, associate and former Secretary, Warren Jacobs; a man beloved by all, a man whose charm, sincerity and ceaseless energy was a constant inspiration and example to each of us, whose quiet helpfulness was at all times of greatest aid and whose companionship already is missed:

Therefore, be it *Resolved*:

That the Society spread upon its minutes, this record of its overwhelming loss and transmit a copy of this Resolution to Mr. Jacobs' widow and daughter, in addition to publishing it in the next Bulletin sent to its membership.

Be it so Ordered.